A Hydrogeologic Evaluation of the Richland County Landfill, Mansfield, Ohio

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Date: 29 May, 1984

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ABSTRACT

This report gives an overview of waste disposal methods, then focuses on sanitary landfills. The aim of a sanitary landfill is to minimize the amount of leachate filtering through the landfill into the groundwater below. The proper construction of a sanitary landfill, and the proper construction sites are discussed.

The Richland County Landfill is evaluated according to this backgound knowledge. Of special interest is the hazardous waste stored at the landfill. The site was found unacceptable to store anymore hazardous wastes, and monitoring of the site was implemented to check groundwater quality. Such monitoring will be necessary even after the landfill's fast-approaching closure, for a period of years.

I. PROLOGUE

Mansfield is an aging, heavy industrial city in North Central Ohio. Its industrial base is eroding, as is its infrastructure and population. This report's guess-timate is a current population of 60,000. With this declining tax base, the city and county have cut some spending corners, including at the Richland County Landfill, which serves as the municipality's waste disposal site.

This report is presented in two major parts. First, waste disposal techniques are reviewed, ending with a detailed study of the proper construction and location of a sanitary landfill. Secondly, the Richland County Landfill will be evaluated.

The Richland County Landfill is a disposal site for some hazardous waste, but only in a secondary role. Therefore, this report will deal MAINLY with those topics important to a sanitary landfill.

II. INTRODUCTION

The industrial revolution has had a tremendous impact not only on man and society, but on his environment as well. The natural environment was able to recycle with no adverse effects, all of pre-industrial man's less "civilized" wastes. The industrial revolution has created a profusion of new products, and literally mountains of by-products and waste. The natural recycling processes cannot keep up with the volume of paper, plastic and metal products, products of civilized man's productivity. The industrial revolution also has had a per-

petual motion effect; its products have made man's life easier, raised the quality of life, causing, or at least greatly helping the population to explode, therefore creating new customers. Industrialization has also led to greater urbanization of the population. More people in a compact area has lead to waste disposal problems.

Early on in the industrial revolution, factories were located near rivers, for ease of natural transport. These same rivers made great disposal sites, "out of sight, out of mind", "dilute and disperse". The river carried the wastes away, and the idea worked for a time. As industrialization and civilization increased, the rivers couldn't handle the waste load anymore, and a new means of refuse disposal needed to be found.

ALTERNATIVE WASTE DISPOSAL METHODS

Open trash burning, ocean dumping, or dumping of refuse in any available, isolated ravine or depression served as waste disposal methods for a time, but because of air and water polution, rodent and insect infestation, public safety, and simple aesthetic value, other means are now used for refuse disposal.

Common methods of solid waste disposal used today include on-site disposal, composting, recycling, incineration, and sanitary landfills.

On-site disposal is the grinding of food garbage, and flushing it into the sewage system, where it becomes somebody else's problem. Composting is a biochemical process wherein most organic waste is decomposed to a humus like material by the action of aerobic bacteria. This process is much more

popular in Europe, and especially Asia, but is expensive here because of the need to separate the organic waste.

Recycling is still coming into its own as a cost effective means of waste management. Increasing costs of raw materials, energy, transportation, and land make recycling an industry sure to grow in the future. Little is recycled now, and some products will probably never be recyclable, but waste should be regarded as resources out of place.

Incineration is the reduction of combustible waste to an inert residue by burning at high temperatures. (900°-100°C) (Keller, 1982, p. 273) This controlled combustion reduces the weight and volume of solid waste, reducing the amount of waste that must be hauled away to a disposal site, an important consideration to a large city with limited disposal area within economic hauling distances.

Open dumping of waste on the land was an easy, inexpensive waste-disposal technique, but an Ohio law passed in July 1969 against open burning or dumping of refuse did away with the old "city dump". Since then, "sanitary" landfills have been the most popular waste disposal method.

ADVANTAGES OF A SANITARY LANDFILL

1. Most economical method of solid waste disposal when land is available.
2. Initial investment is low compared to other methods.
3. Operation can begin within a short period of time.
4. All types of waste can be disposed of, eliminating separate collections.
5. Completed sites may be used for other purposes.

DISADVANTAGES OF A SANITARY LANDFILL

1. In densely populated areas, suitable land may not be available at economical hauling distances.
2. Daily maintenance is required, and constant surveillance.
3. Methane and other gases may be produced and create a nuisance or hazard.
4. Unless properly engineered, leachate may be a continuing problem for years.

SANITARY LANDFILL CONSTRUCTION

Solid waste disposal is primarily an urban problem, and in the U.S., urban areas produce 640 million kilotons of solid waste each day (the composition of waste in an average landfill is given in Table 1). That amount of waste is sufficient to cover 1.6 square kilmeters with three meters of refuse per day (Keller, 1982, p. 272). Municipal solid waste in the United States has increased from 1.2 kilograms per day in 1920, to 2 kilograms in 1965, to 3 kilograms per person per day in 1975 (Coates, 1981, p. 648). This reflects the increasing urbanization of a growing population, and explains why the new catch-words of waste disposal are "concentrate and contain". The sources of municipal waste are shown in Figure 1.

On the average, a good sanitary landfill requires one half-acre per year for every 25,000 people it serves (Coates, 1981, p. 650). However, suitable land is getting expensive, and harder to find. No one wants a landfill in their backyard.

METHODS

A "sanitary" landfill requires that the refuse be covered daily with a layer of low permeability earthen material. This layer cuts down on lechate, and also on the amount of loose refuse blowing about, and, most importantly, the cover stops disease carrying animals and birds from rooting around in the garbage. There is also an aesthetic sense that is fulfilled when the refuse is hidden from the eye, and from the nose.

On flat to gently sloping surfaces, as well as in natural or man-made broad depressions, the area method is preferred. Wastes are spread and compacted on the original land surface,

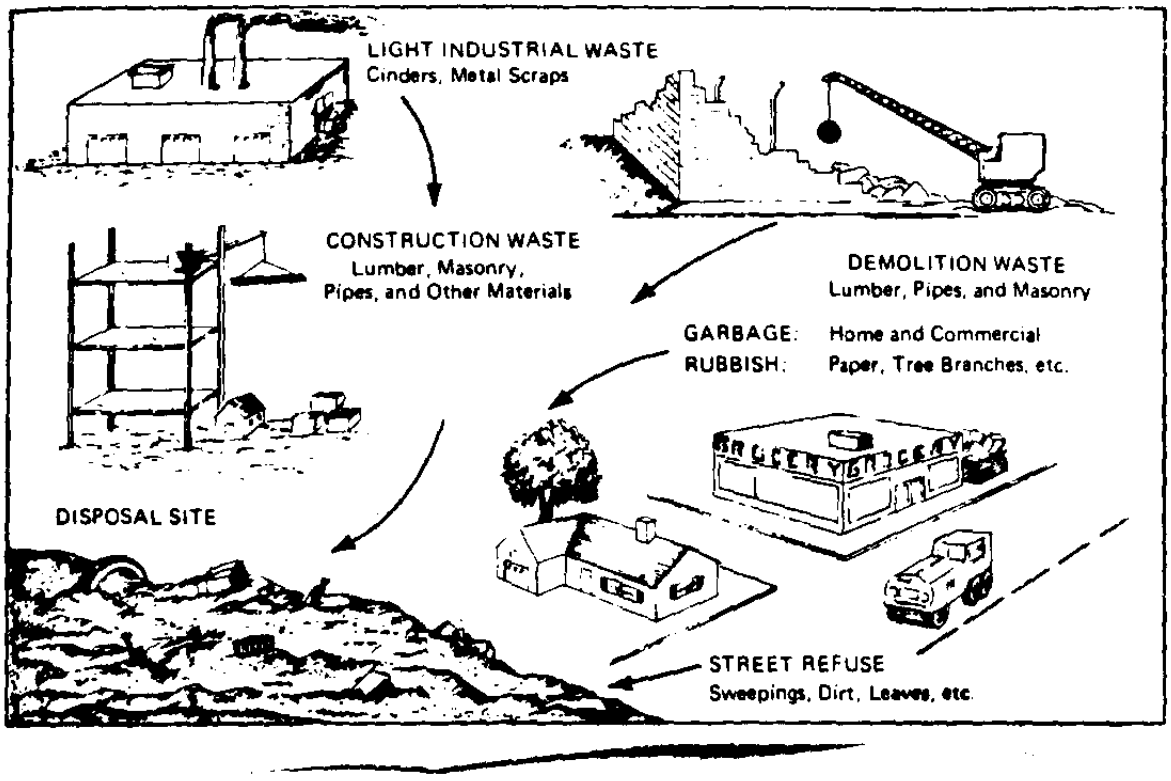


Figure 1 (After Griggs and Gilchrist, 1983, p.367)

TABLE 1
Generalized composition of solid waste likely to end up at a disposal site.

Type of Waste	Average (%)
Paper products	43.8
Food wastes	18.2
Metals	9.1
Glass and ceramics	9.0
Garden wastes	7.9
Rock, dirt, and ash	3.7
Plastics, rubber, and leather	3.1
Textiles	2.7
Wood	2.5
Total	100.0

Table 1 (After Griggs and Gilchrist, 1983, p. 366)

which is covered with earth to form a "cell", which represents one day's waste. The same procedure is followed to form adjacent cells, or cells can be stacked (Figure 2). Upon completion of the site, the uppermost waste layers are covered with 2 feet of low permeable material, and planted with vegetation to stabilize it.

The trench method involves the excavation of a broad trench, or series of trenches into which waste is dumped and compacted into cells, as described above (Figure 3). The cover material is supplied by the excavated material. This method is best suited to level or gently rolling terrain where the water table is deep.

The ramp or slope method is a technique that is economical for small operations. This method is used on sloping terrain, or in combination with other methods. The refuse is spread over a hillside, compacted, and covered with soil, excavated from the base of the ramp (Figure 4).

Completed landfill sites have been used for a variety of purposes; parks, playgrounds, gardens and parking lots. Some have been built up to form ramps or ski slopes. Landfills are, however, poor sites for erecting buildings, because of the settling that tends to go on for decades. Lechate and escaping gases are also troublesome.

REGULATIONS AND RECOMMENDATIONS CONCERNING LANDFILLS

Regulation HE-24-04 (A) of the Ohio Sanitary Code (Ohio Department of Health, 1969) states: "Solid waste disposal sites and facilities shall not be located in areas where they constitute a hazard to the quality of the ground water or surface water resources or create a health hazard". In ad-

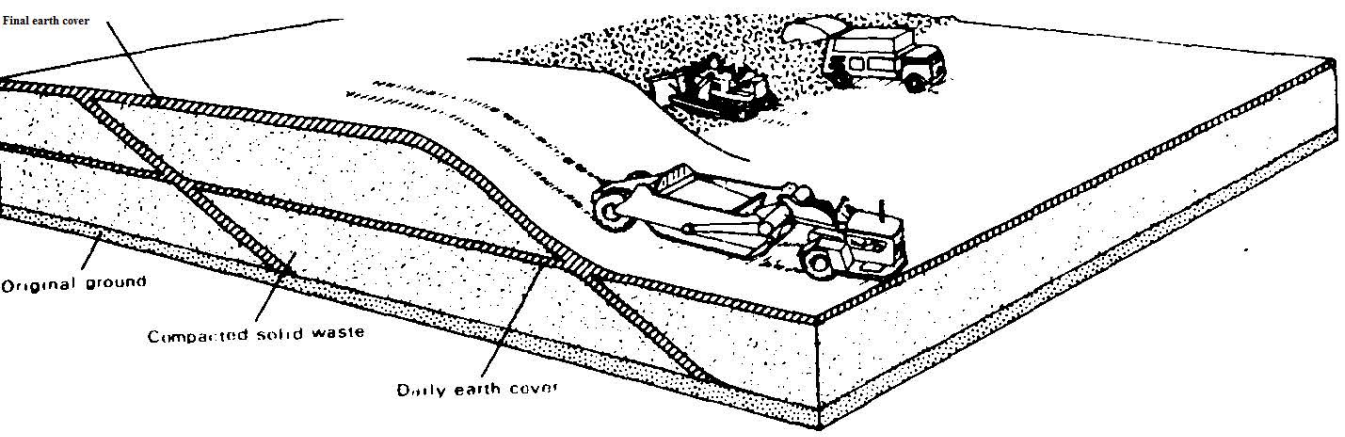


FIGURE 2-Area method of landfilling (from Lewicke, 1972).

(After ~~Groenwald,1974,p.2~~,

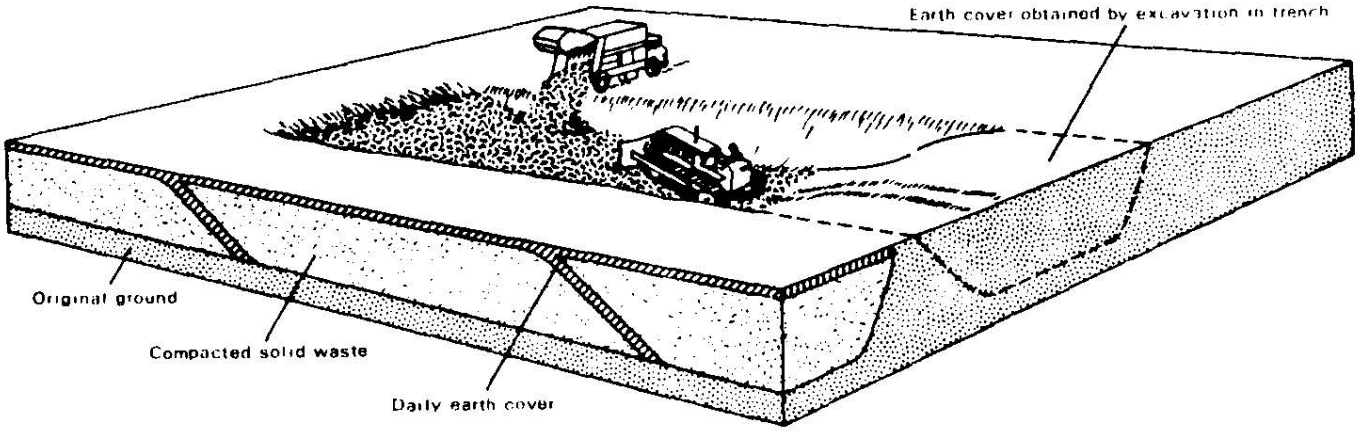


FIGURE 3 -Trench method of landfilling (from Lewicke, 1972).

(After Groenwald,1974,p.2)

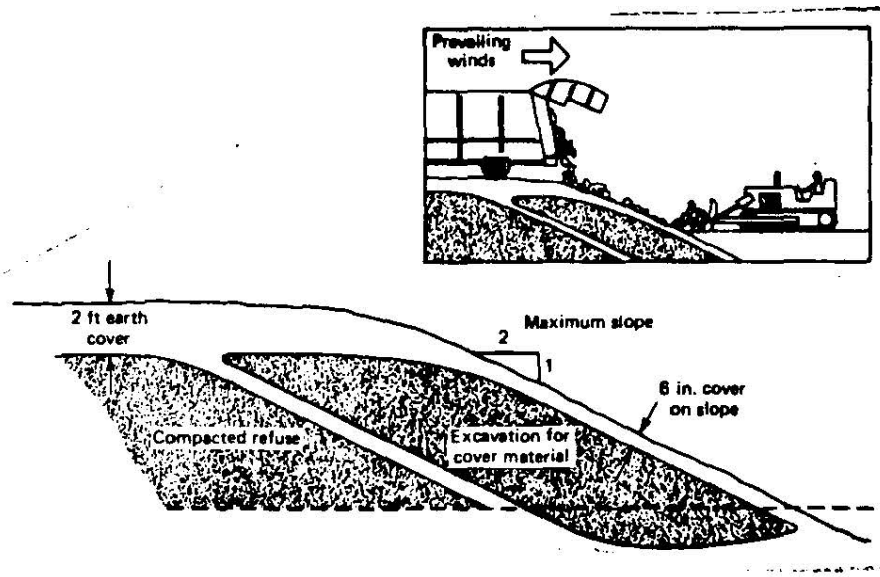


Figure 4 Ramp method (or slope method) for a sanitary landfill.

(After Coates,1981,p.656)

dition, HE-24-04 (B) states: "No person shall place or dispose of solid wastes in any ditch, stream, river, lake, pond, or other watercourse, except those waters which do not combine or effect a junction with natural surface or underground waters or upon the banks therof where the same is liable to be washed into the waters by ordinary flow or annual floods. This division does not apply to the placing of any substance under authority of a permit issued by the water pollution control board." (Groenwald, 1974, p. 2)

The entire Ohio Solid Waste Disposal Regulations are located in Appendix A.

In the humid climate that exists in Ohio, no matter where a landfill is located, leachate will be produced either from preapelation infiltrating the cover, or from ground water contact. According to Local Climatalogical Data (1968) of Mansfield, Ohio, precipitation averaged 38.16 inches per year, recorded at Mansfield Lahm Airport, which is immediately adjacant to the landfill. The landfill must be located in such a manner as to produce the least amount of lechated, and the leachate migration through the soil must be retarded, both by distance to the water table and by low permeability of the soils, allowing more time for natural purification of the leachate.

PERMEABILITIES

Basically, all materials contain empty spaces, or pores. When these pores are full with water, they are saturated. The upper limit of saturation is called the water table, and the soil zone above the water table which is only partially saturated, is called the zone of aeration. The water table depth fluctuates seasonally.

The greater the size and interconnection of pore spaces, the greater the permeability of the materials (Figure 5). Dense, rigid consolidated rocks (granite, shales, limestones) are essentially impermeable, unless fractured, and so make poor materials to put landfills in. Little or no purification takes place in these rocks, and fractures make for less than predictable leachate flow paths.

Lechate is the water that infiltrates through the landfill, through the zone of aeration into the general ground water system (Figure 6). To control any pollution in the leachate, its flow must be determined. Unconsolidated materials usually yield easily predictable paths of leachate.

SITE SELECTION

A. TEXTURE

A landfill should be located in soils so as natural purification of the leachate is maximized. The texture and composition of the soil determines processes of filtration, absorption, biodegradation and ion exchange. The processes are more efficient in the zone of aeration, rather than below the water table. Fine textured materials (clay, silt, sandy shale, glacial till) are the most effective in removing dissolved solids. Studies at a waste disposal site in Illinois show that:

> "The passage of leachate through 1-2 meter of silt rich clay lowered the total dissolved solids by the same amount of flow through 211 meters of sand." (Griggs and Gilchrist, 1983, p. 363)

The lower permeability means there is greater surface areas, which means more chemical activity takes place with the clays, which leads to significantly decreased concentrations of dis-

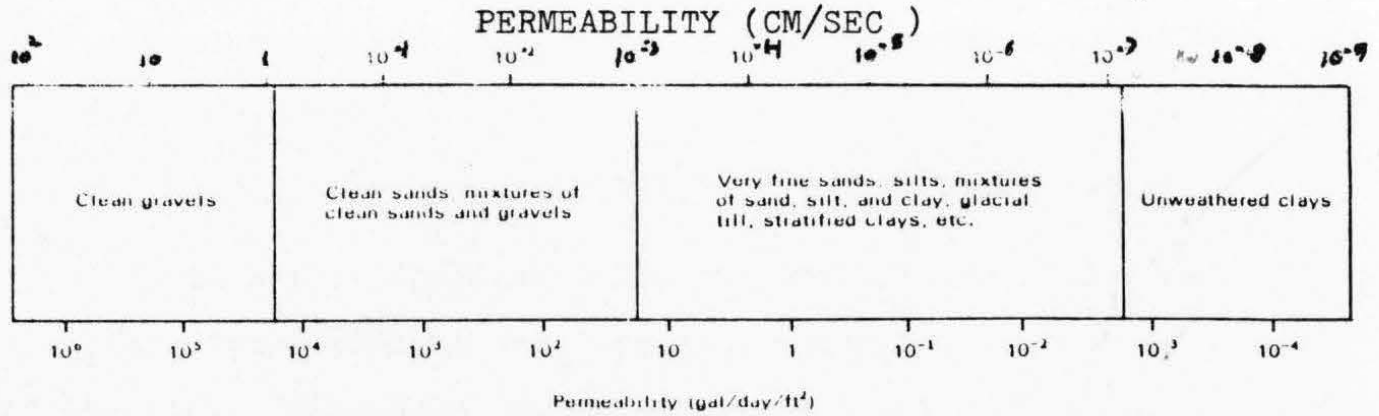


FIGURE 5.-Ranges in permeability of various unconsolidated sediments (modified from Todd, 1959, p. 53).

(After Groenewald, 1974, p.3)

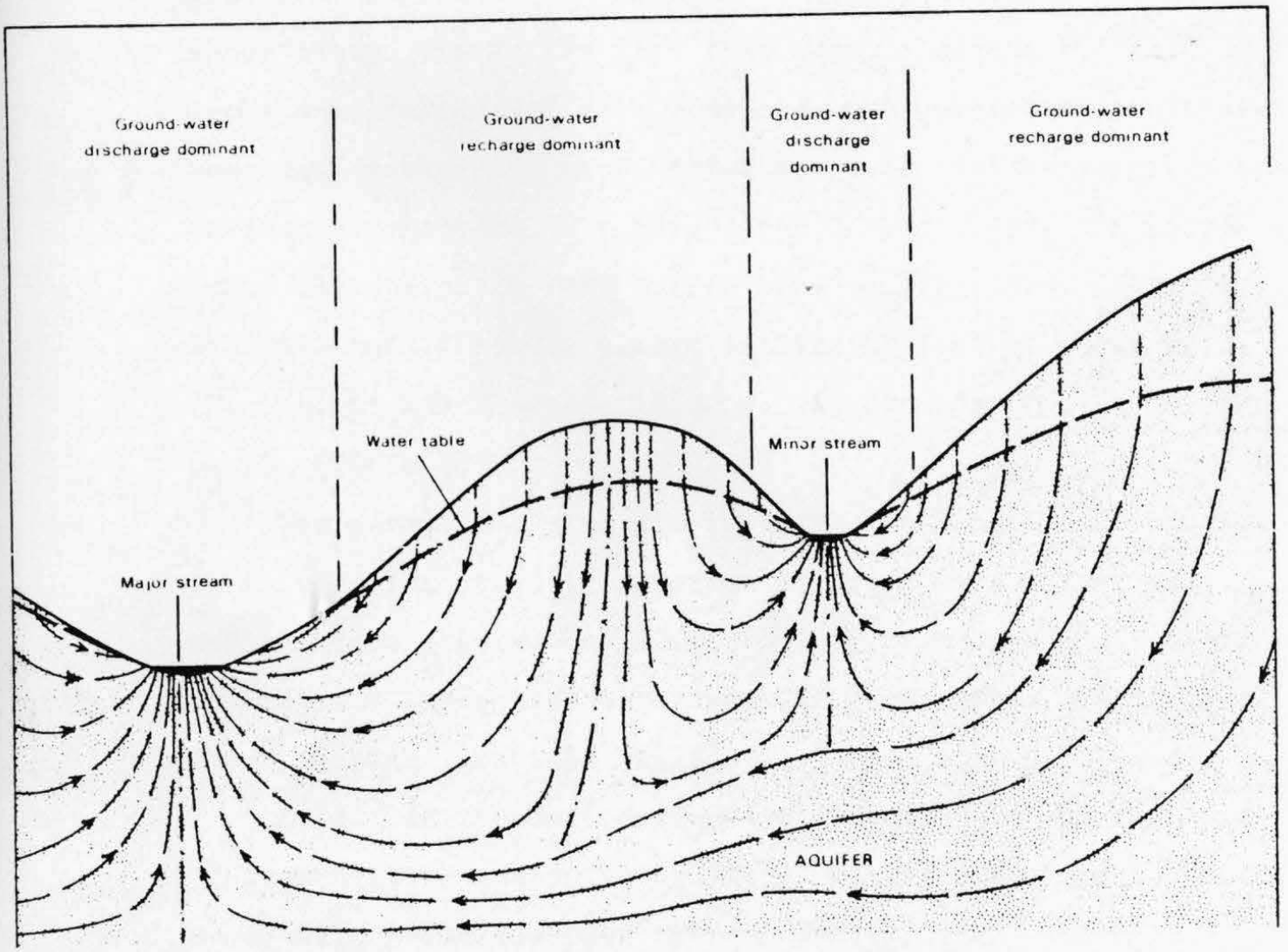


FIGURE 6.-Idealized cross section showing ground-water flow lines in a homogeneous material (modified from Otton, 1972, p. 14).

(After Groenewald, 1974, p.4)

solved ions and other substances even after transport over short distances. In contrast, the flow through coarser-grained sands and gravels is relativily rapid and little is filtered out.

B. POSITION OF THE WASTE RELATIVE TO THE WATER-TABLE

If waste is placed below the water table, then the groundwater adds to the leachate, raising the pollution potential. Therefore, it is better to place refuse above the water table, where the only leachate is the result of infiltration through the cover of the refuse. The farther the refuse sits above the water table, the greater the amount of natural filtering that will take place. Natural purification is greater in the zone of aeration than below the water table, due to the fact that aerobic degradation of lechate is faster and more complete than anaerobic processes. Recommended separation of wastes and water tables is given by various researchers in a range from 5 to 30 feet. In Ohio's humid climate, a 25 foot buffer zone is suggested. Also, a landfill should not be placed within 500 feet of a dug well. (Cartwright and Sherman, 1969, p. 12, from Groenwald, 1974, p. 5) (Table 2)

The permeability of the material the landfill is located in is very important in order to figure a safe buffer zone. While Ohio's glacial tills may call for a buffer of 25 feet, a sandy, or impervious material will need a detailed study of those precise locations (Figure 7).

Landfills in humid areas have a problem in the formation of ground water mounds below them. A completed landfill tends to be more permeable than the surrounding area, which tends

Table 2 Summary of criteria for evaluating landfill sites

Criterion	Description	Evaluation
Unconsolidated Materials	Silty clay, boulder clay(till)	Favorable
	Sand, gravel	Unfavorable
Consolidated Materials	Sandy shale, siltstone	Favorable
	Shale, unfissured limestone	Questionable
	Sandstone, fissured limestone	Unfavorable
Thickness of impermeable material between waste and water table	25 feet or more	Favorable
	Less than 25 feet	Unfavorable
Topography	Flat upland areas, moderate slopes, heads of gullies and ravines, dry strip mines.	Favorable
	Closed depressions where water accumulates, steep slopes, floodplains, lower reaches of gullies and ravines	Unfavorable
Water sources	Deep bedrock wells, sand and gravel wells where aquifer is overlain by impermeable cover, dug wells if at least 500 feet from the landfill	Favorable
	Shallow bedrock wells(fissured limestone particularly unfavorable), sand and gravel wells where aquifer has little or no impermeable cover, any dug well within 500 feet of the site	Unfavorable

(After Gerald H. Groenewold, Hydrogeologic and other considerations related to the selection of sanitary landfill sites in Ohio, Columbus 1974)

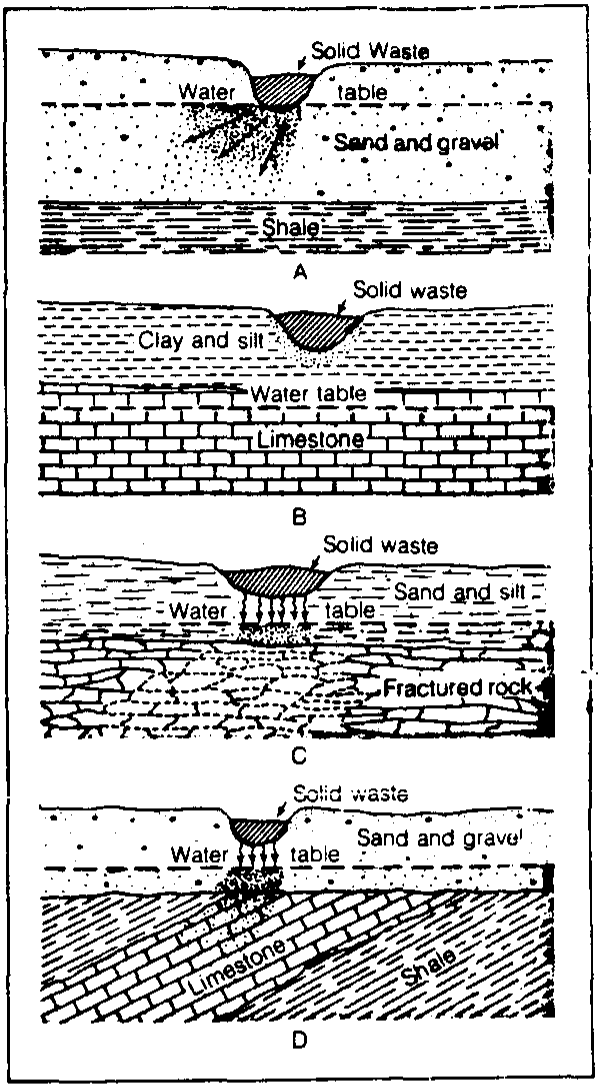


FIGURE 7
Effects of subsurface geology and hydrology on the fate of leachate from a solid waste disposal site. (A) A high water table and permeable rock can lead to rapid transport of leachate and groundwater contamination. (B) An impermeable rock type underlying a solid waste disposal site will contain any leachate and prevent contamination. (C) An aquifer consisting of fractured rock may also be contaminated by leachate. (D) If the water table is high beneath a dump site, contamination can enter the permeable layers, which may also contain groundwater. (Adapted from: W. J. Schneider, "Hydrogeologic Implications of Solid Waste Disposal," U.S. Geological Survey Circular 601-F, 1970.)

(After Griggs and Gilchrist, 1983, p.363)

to accelerate movement away from the site, either downward or laterally. The mound forms because more water is infiltrating the cover than is able to move away from the landfill. To minimize mounding, the amount of precipitation and surface flow which infiltrates the cover should be decreased, such as by lining the pit, or using piping to drain lechate away from the landfill (Figure 8). Any springs or seeps from the landfill will prove a potential hazard to any nearby surface waters. It is important to place a landfill away from surface waters, to minimize the danger of flooding, which would saturate the landfill, causing more leachate, and scatter waste.

C. POSITION OF LANDFILL, RECHARGE/DISCHARGE AREA

A landfill in a recharge area will leach downward, putting underlying aquifers in jeopardy. Therefore, recharge sites should have large soil buffer zones and soils with low permeabilities to maintain good water quality.

In discharge areas (Figure 6) the gradient is upward, and the lechate is unlikely to reach the underlying aquifers, even in highly permeable materials. However, discharge areas are commonly associated with surface water bodies, so there is a pollution threat to these. The monitoring of pollutants is easier because they will remain at the surface in a discharge area. If leachate collection and treatment is considered, a discharge area landfill is best. Mixing and diluting of pollutants is faster in surface waters, so leaks are taken care of faster, and at less expense.

COVER MATERIALS

Materials of low permeability are best, to reduce in-

PLAN VIEW

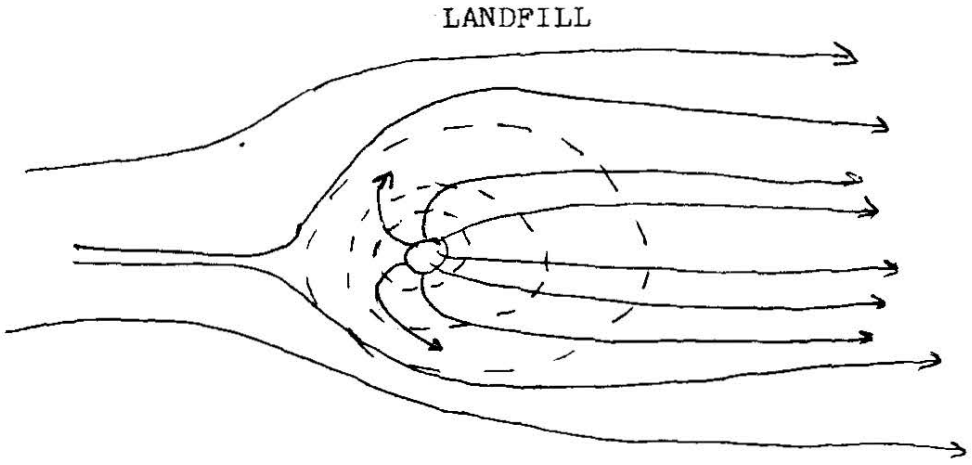
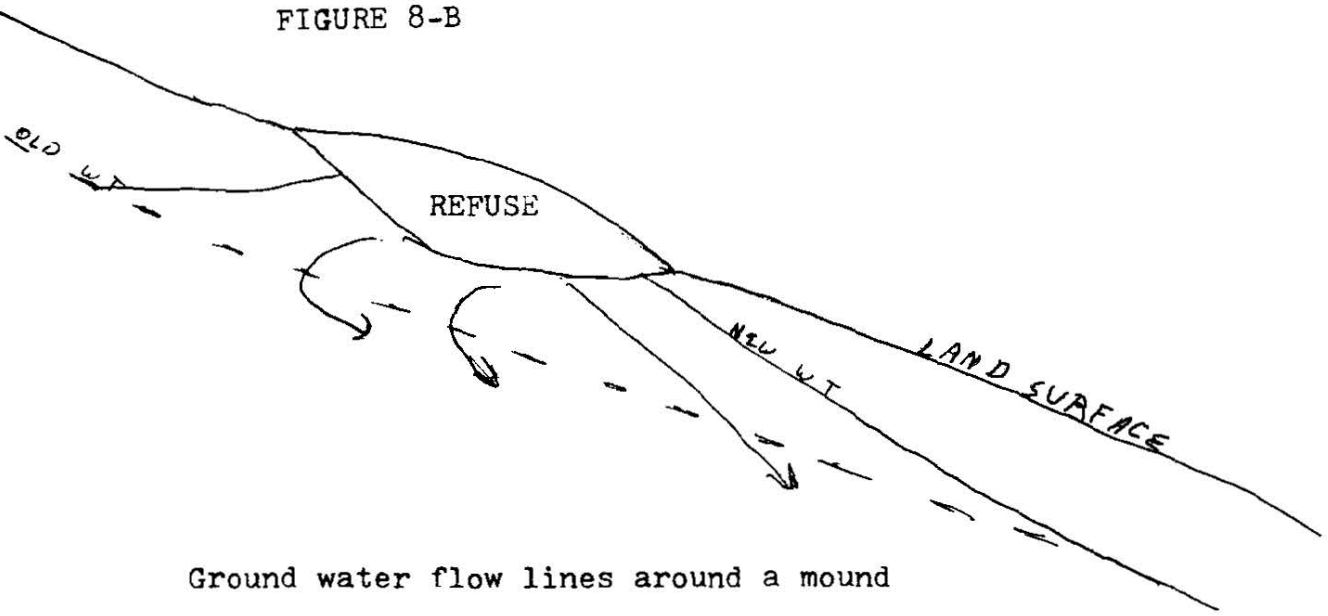


FIGURE 8-A

CROSS-SECTION

FIGURE 8-B



Ground water flow lines around a mound formed at a landfill

filtration and leachate production. In glaciated areas, most tills are acceptable cover materials. Daily cover is 6 inches, intermediate cover of 12 inches is necessary on a temporarily inactive site, and a final cover of 2 feet is used, more if the area will be used for trees or agricultural purposes.

TOPOGRAPHY

Topography is a major factor in site selection. It includes slope stability, site accessibility, and drainage. Steep slopes often lack adequate cover material, and may be unstable. Flat areas are often stream beds or flood plains, also unsuitable sites. Moderate slopes are just right. Infiltration is generally less on a slope than a flat surface.

LANDFILL GASES

Methane and carbon dioxide are the major gases produced, with hydrogen sulfide as a lesser constituent. (U.S. Dept. of H.E.W., 1969, p. IX-4, from Groenwald, 1974, p. 6) Methane is explosive, and may need venting. Carbon dioxide can react with the ground water to form carbonic acid.

Fine grained cover material greatly hinders the escape of gases, causing them to move horizontally, a danger to nearby building. A site should be carefully checked for this potentially dangerous problem. The amount of methane produced is enough that its potential as an economical energy source has been realized at a number of old landfill sites.

It must be remembered that when a landfill is full; no more waste is being dumped and the operation has moved on, the leaching or gas venting hasn't stopped. The area must be monitored for years to check pollution.

III. RICHLAND COUNTY LANDFILL

INTRODUCTION

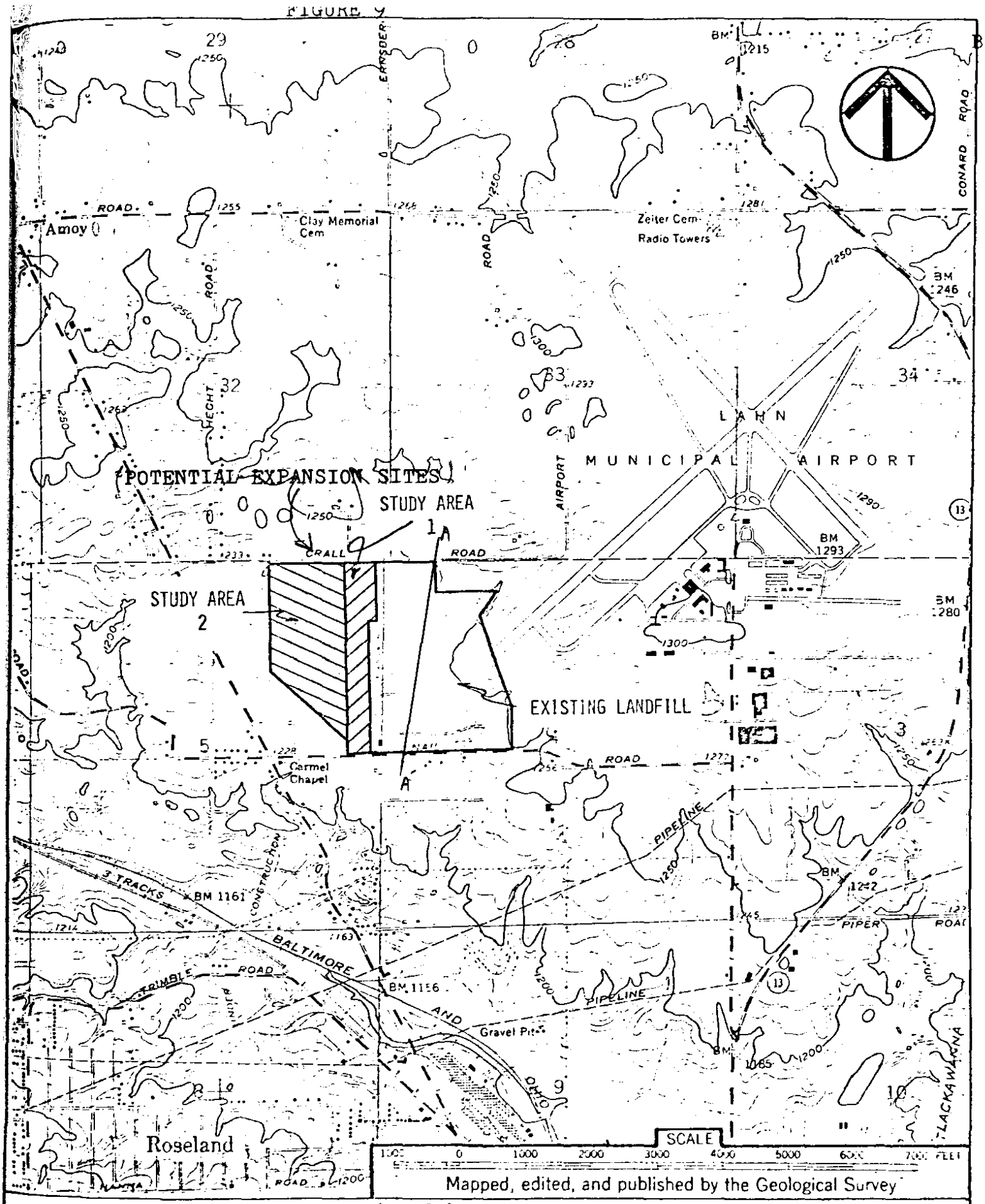
There are several reasons for my interest in the Richland County Landfill, other than the fact it is my home county. The heavy metals dumped at the site, in combination with the usual wastes of a municipality are a possible threat to other resources. The hydrogeologic conditions of the site are not ideal for a sanitary landfill, and especially not for a hazardous waste landfill. All this, plus the fact that much data was available on the area, made this an interesting project to pursue.

The hazardous waste dumped at the landfill, and the potential harm from it, were discussed during an interview with Mr. Steve Thacker, of the Ohio E.P.A., while researching a different project.

LOCATION

The Richland County Landfill is located north of Mansfield, Ohio, adjacent to Mansfield Lahm Municipal Airport (Figure 9 and Appendices B and C). The landfill is bordered on the north by Crall Road; on the west by the corn fields of a farm; on the east by the airport; and on the south by Cairns Road. Easy access from Mansfield and its environs is afforded by Routes 30 and 13 (Main Street) to Airport Road to Cairns Road.

The site is located on city-owned land that is leased by the county. The landfill covers approximately 230 acres, but currently only the northern 100 acres are being used, and these are filling quickly.



LOCATION MAP

RICHLAND COUNTY LANDFILL—— RICHLAND COUNTY

DRAWN BY: MWK	CHECKED BY: KCM	PROJECT NO: 81C8033	DATE: 13 Oct. 81	FIGURE NO: 1

WOODWARD-CLYDE CONSULTANTS

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Locating the landfill at the end of the airport runway helps to isolate the landfill, but has created a problem with the birds that feed at the dump, as they sometimes collide with aircraft.

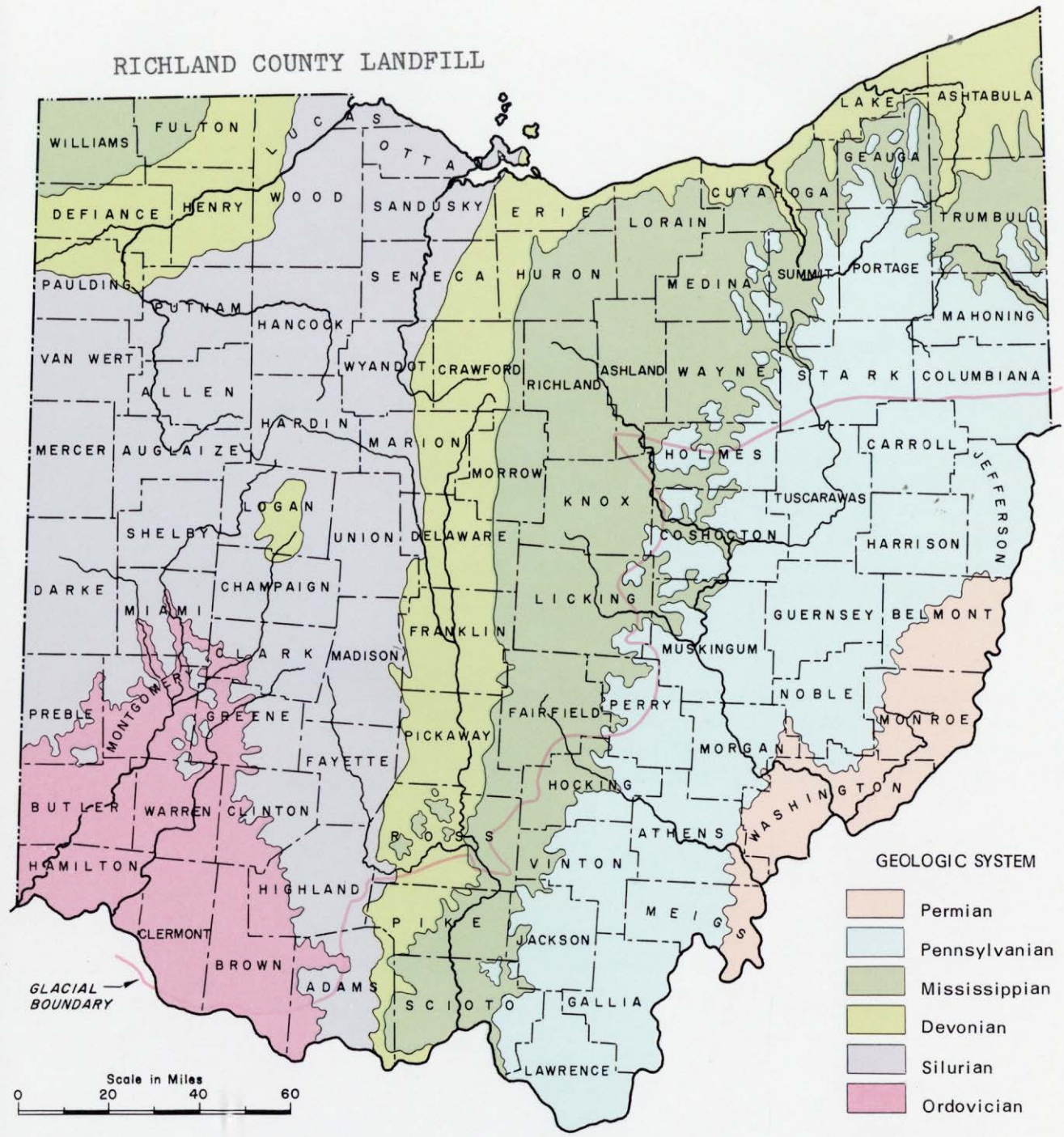
GEOLOGIC SETTING

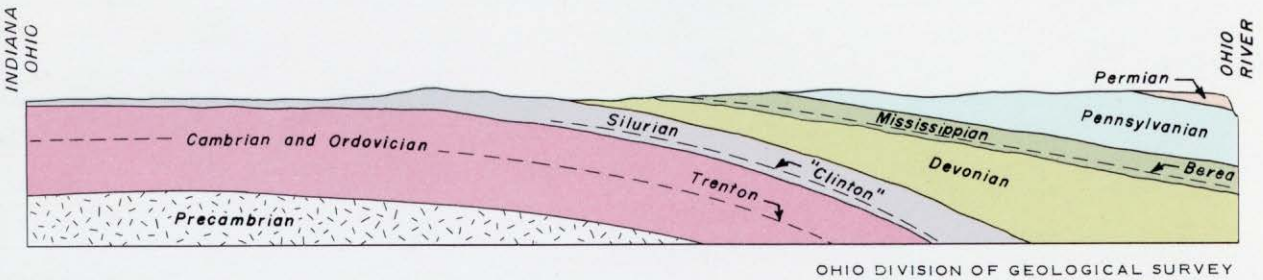
The Richland County Landfill is in the glaciated section of the Allegheny Plateau physiographic province. The area is identified as the glaciated section of the high plateau by George White (White, 1933. p. 14). The stratigraphy of the area consists of glacially-derived tills and outwash deposits overlying bedrock; mostly sandstone and shale.

The bedrock underlying Richland County is of the Mississippian System. These strata lie on the eastern limb of the Cincinnatti Arch, striking north-south, and dipping to the east-southeast at about 25 feet per mile (White, 1933, p. 14) (Figure 10). Table 3 shows a stratigraphic section of the underlying Mississippian and Devonian System. According to Thacker (personal communication) of the Ohio E.P.A., the sandstone at the top of the Cuyahoga Formation is the Blackhand sandstone, which serves as the major aquifer for the area. In the landfill area, the Blackhand is the bedrock immediately underlying the overburden. The Blackhand is a large, lens-shaped, coarse-grained, sometimes conglomeratic, usually buff to brown sandstone that may be as thick as 275 feet at the landfill (Woodward-Clyde Consultants Report, 1981, p. 6). The resistant nature of the sandstone is shown in ledges and small cliffs apparent in the high, steep walls of the stream cut southwest of the landfill, and in area road-

FIGURE 10

RICHLAND COUNTY LANDFILL





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GEOLOGIC MAP AND CROSS SECTION OF OHIO

Table 3 Stratigraphic Section of Bedrock

Mississippian System	
Waverly Series	
Logan sandstone and sandy shale	1'0
Cuyahoga sandstone, thin to massive, and shale	335
Sunbury shale, fissile	20
Berea sandstone	45
Bedford shale, ferruginous to siliceous	85
Devonian System	
Ohio shale, carbonaceous	600
Olentangy shale, siliceous, soft	30
Delaware limestone	45
Columbus limestone	100

(After White, 1933, p.14)

cuts. The sandstone has significant primary permeability, but most important is the secondary permeability, along fracture and bedding planes (Henning, 1978, p. 104).

During the Pleistocene there were three major glaciations that left their mark on Ohio (Figure 11, note the different ages of glacial deposits). An early glaciation in Ohio disrupted the northward drainage in Richland County into the Teays River system (Figure 12 - a, b). Further changes occurred in stream flow as glaciers advanced and gouged the bedrock, and as outwash streams eroded more channels and also changed the bedrock topography. The later drainage changes in Richland County are shown in Figure 12 - c, d.

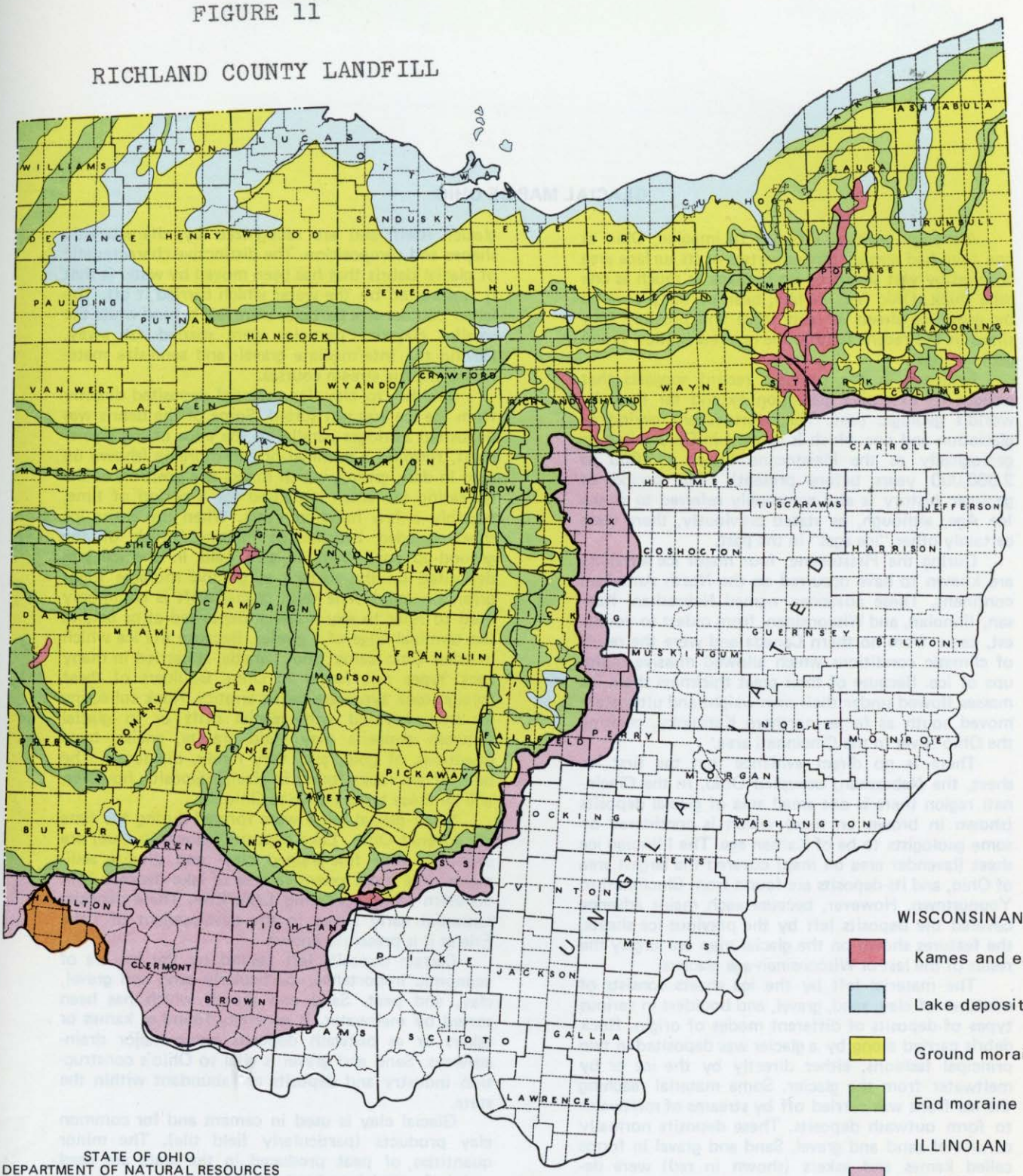
In the landfill area a stream valley was eroded, with one wall of bedrock just a few feet below land surface at the southern edge of the landfill (Appendix B).

The soils in the landfill area are the result of the Wisconsinan Glaciation, the last major ice advance in this area. Two main lobes of ice reached Central Ohio; the Scioto and the Killbuck, with the Killbuck lobe moving thru the landfill area (Shaw, 1966, p. 15). This lobe made several minor advances and retreats, with the result of each retreat being a distinctly separate till deposit. As a glacier moves forward it may act as a bulldozer, pushing material ahead of it; and as sandpaper, it abrades and breaks off material under and beside of it. This abrasion produces very fine rock particles, called rock flour (Sanders, 1981, p. 315), which means that this soil is sometimes quite fine-grained.

As the glacier reaches its furthest limits, it leaves material in a ridge around its outer border. This is material

FIGURE 11

RICHLAND COUNTY LANDFILL



WISCONSINAN

- Kames and eskers
- Lake deposits
- Ground moraine
- End moraine

ILLINOIAN

- Undifferentiated

KANSAN

- Ground moraine

10 0 10 20 30 miles
Scale

STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
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ADAPTED FROM GLACIAL MAP OF OHIO, U.S. GEOL. SURVEY MISC. GEOL. INV. MAP I-316

GLACIAL DEPOSITS OF OHIO

GLACIAL MAP OF OHIO

Although perhaps difficult to imagine, Ohio at one time had almost three-quarters of its surface area covered by vast sheets of ice perhaps as much as one mile thick. Ohio has, in fact, been partially covered by great ice sheets at least three and possibly four times in the recent (within the last few million years) geologic past.

Evidence in the geologic record suggests that periods of extensive glaciation extend far into the world's geologic past. The most recent period of glaciation and one which is evident in Ohio is known geologically as the Pleistocene Epoch (11,000 to 2,000,000 years before present). This period of geologic history is also commonly referred to as the Ice Age, although, as stated previously, there were certainly other "ice ages" in the past.

During the Pleistocene, four major ice advances are known to have occurred on the North American continent. These advances, named Nebraskan, Kansan, Illinoian, and Wisconsinan, from oldest to youngest, came from northern Canada and were the result of climatic conditions which allowed massive build-ups of ice. Because of their great thickness these ice masses flowed under their own weight and ultimately moved south as far as northern Kentucky, crossing the Ohio River in the Cincinnati area.

There is no direct evidence that the first ice sheet, the Nebraskan, occupied Ohio. In the Cincinnati region there is one small area of glacial deposits (shown in brown on map) which is considered by some geologists to be of Kansan age. The Illinoian ice sheet (lavender area on map) covered the largest area of Ohio, and its deposits are found from Cincinnati to Youngstown. However, because each major advance covered the deposits left by the previous ice sheets, the features shown on the glacial map are largely the result of the last or Wisconsinan-age glaciers.

The material left by the ice sheets consists of mixtures of clay, sand, gravel, and boulders in various types of deposits of different modes of origin. Rock debris carried along by a glacier was deposited in two principal fashions, either directly by the ice or by meltwater from the glacier. Some material reaching the ice front was carried off by streams of meltwater to form outwash deposits. These deposits normally consist of sand and gravel. Sand and gravel in forms called kames and eskers (shown in red) were deposited by water on and under the surface of the glacier itself and are recognized by characteristic shapes and composition. The distinctive characteristic of glacial debris that has been moved by water is that it was sorted by the water which carried it off. The larger boulder-size particles were left behind while the smaller clay-size particles were carried far away, leaving the intermediate gravel- and sand-size materials along the stream courses.

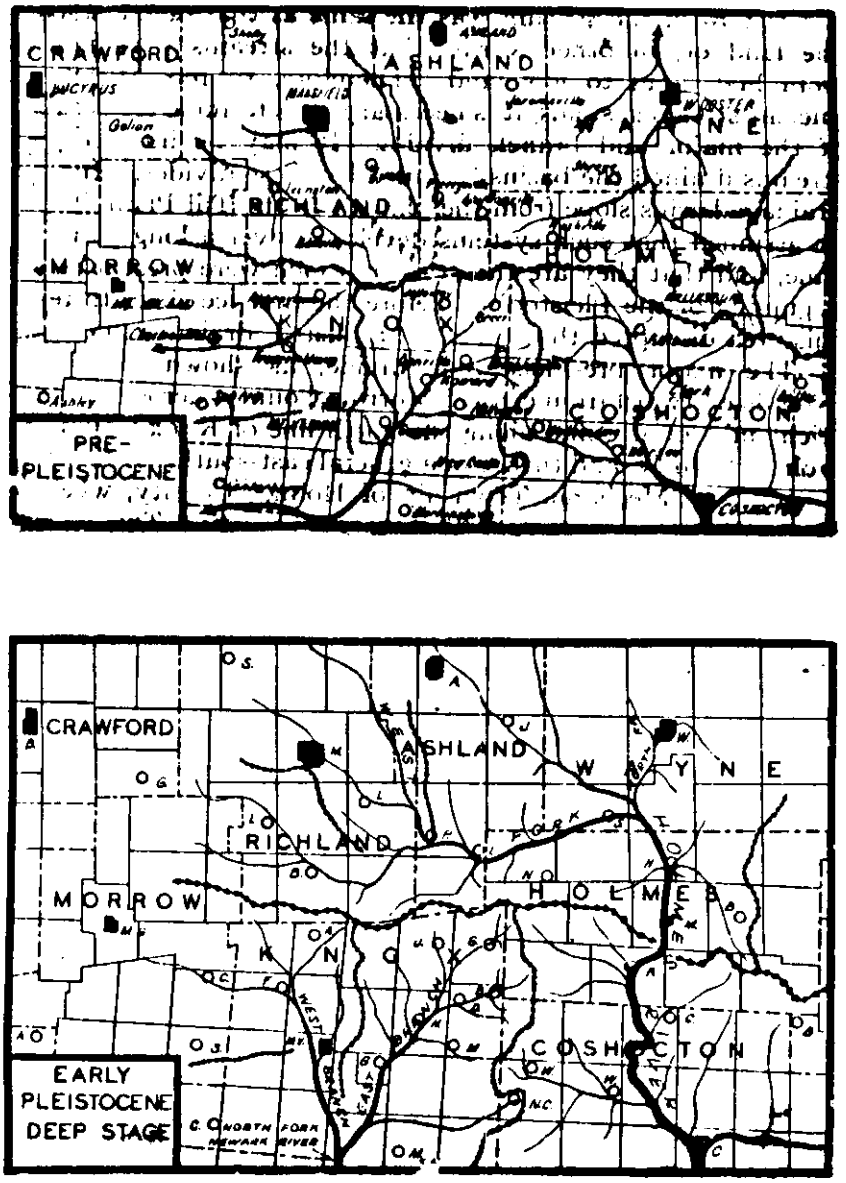
Boulder- to clay-size material deposited directly from the ice was not sorted. Some of the debris was deposited as ridges parallel to the edge of the glacier itself, forming a terminal or end moraine (shown on map in dark green), which marks the position of the retreating ice when it paused for a period of time, possibly a few hundred years. When the entire ice sheet receded because of melting, much of the ground-up rock material still held in the ice was deposited on the surface as ground moraine (light green on map). The term glacial drift is commonly used to refer to any material deposited at or behind the terminal edge of a glacier. Because the ice which invaded Ohio came from Canada, it carried in many rock types not found in Ohio. Boulders of these foreign rock types are called erratics. Rock collecting in areas covered with glacial drift or in glacial outwash deposits may yield granite, gneiss, trace quantities of gold, and, very rarely, diamonds. The bulk of the rocks found in glacial deposits, however, will be those types native to Ohio.

Many glacial lakes were formed during the time ice covered Ohio. Lake deposits (shown in blue) are primarily very fine-grained clay- and silt-size sediments. The most extensive area of lake deposits is in northern Ohio bordering Lake Erie. These deposits represent early stages in the development of Lake Erie as it is presently known.

Certain deposits left behind by the ice are of economic importance, particularly sand and gravel, clay, and peat. Sand and gravel, which has been sorted by meltwater, is generally found as kames or eskers or as outwash deposits along major drainageways. Sand and gravel is vital to Ohio's construction industry and deposits are abundant within the state.

Glacial clay is used in cement and for common clay products (particularly field tile). The minor quantities of peat produced in the state are used mainly for mulch and soil conditioning.

FIGURE 12 — A, B

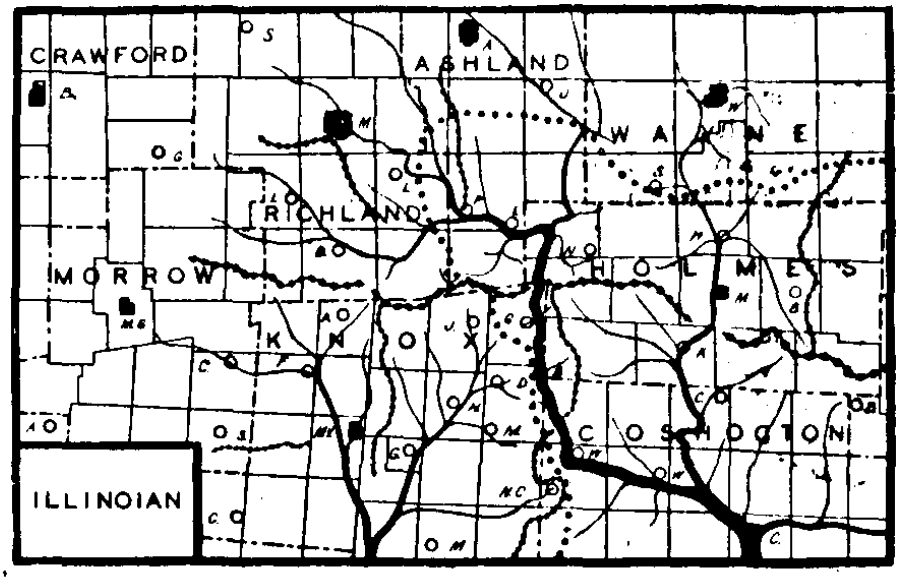


Maps showing Pre-Pleistocene (upper map) and Early Pleistocene (lower map) streams and divides.

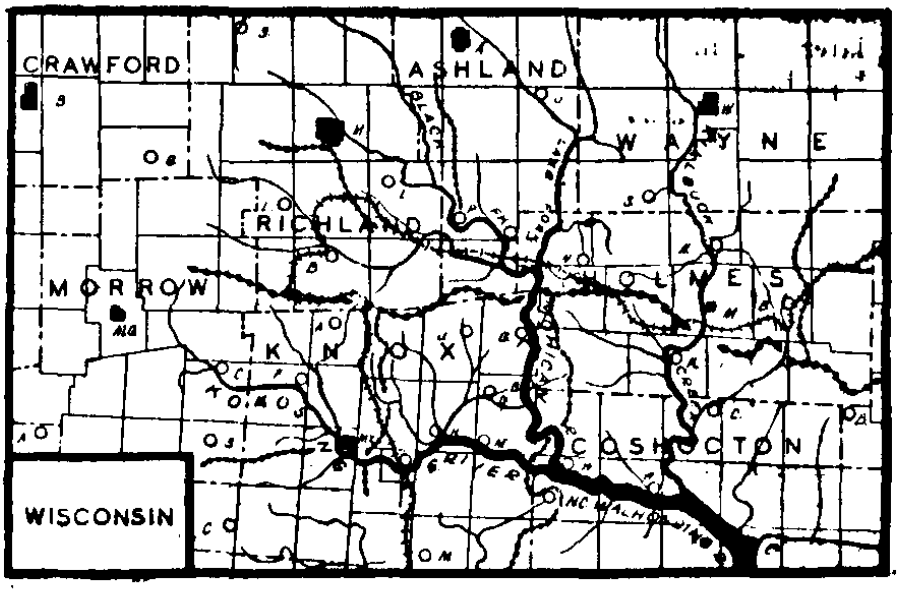
Pre-Pleistocene Divides

(After White, 1933, Plate IV)

FIGURE 12- C, D



(C)



(D)

Maps showing Illinoian (upper map) and Wisconsin (lower map) streams.

• • • Known Illinoian Boundary
o o o Postulated Illinoian Boundary
-v-| Wisconsin Boundary

(After White, 1933, Plate IV)

that was pushed ahead of the glacier, and material carried within the glacier. A glacier is dynamic, even though as a whole it is not advancing. This dumped material is end moraine, the soils of which usually consist of fine-grained silts.clays, with varying amounts of sand, cobbles, and gravel.

Associated with this material are outwash deposits which are interbedded within the tills. These outwash deposits of silty sands and gravels are generally coarser than the tills. The outwash is produced as the glacier front melts, producing shallow braided streams and ponded water areas. The older valleys are generally filled with outwash debris, and are relatively good aquifers in the region (Henning, 1974, p. 105).

The landfill is situated on end moraine material (Figure 11), which because of commonly included lenses of sand and gravel has a higher overall permeability than ground moraine. The higher the permeability of the soil, the worse the site is as a landfill, especially as a reservoir for toxic wastes. The seams of sand and gravel leachate flow horizontally, and to a lesser extent vertically.

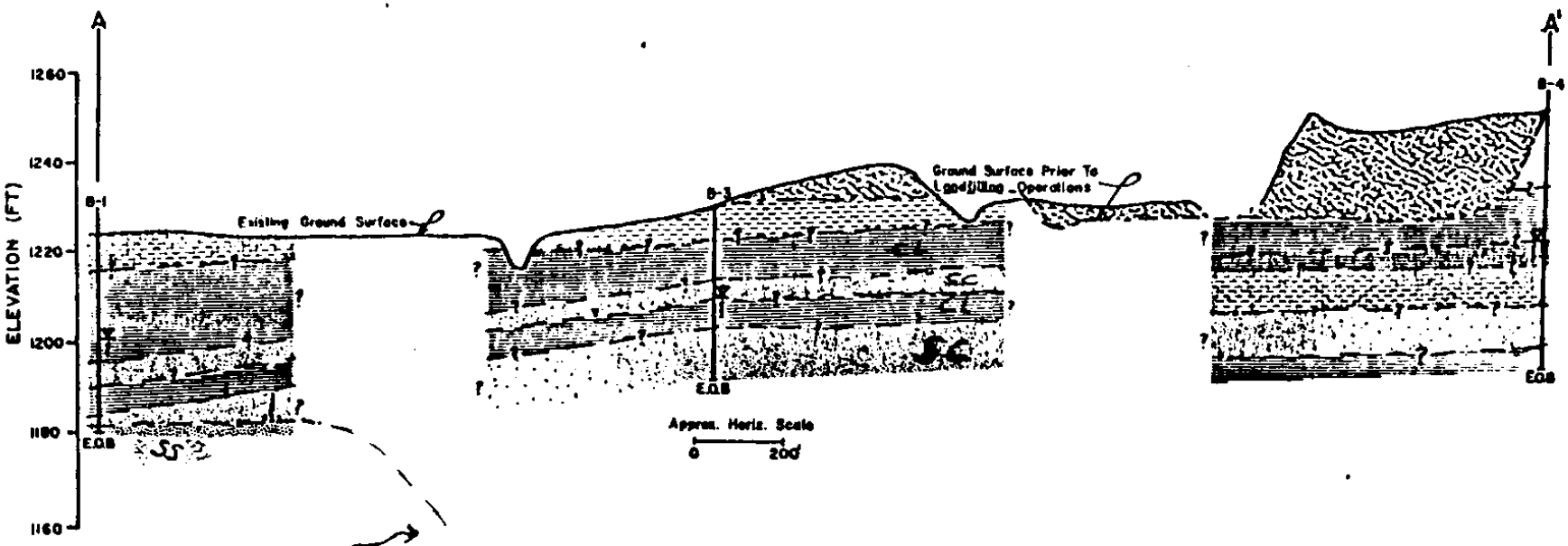
SUBSURFACE PROFILE

This profile was extrapolated from four borings made around the perimeter of the landfill. These borings were done as part of an Empire-Detroit Steel sponsored study by Woodward-Clyde Consultants. The boring logs are in Appendix C. The stratigraphy is shown in Figure 13. The profile starts at the surface.

a) Silt and Clay

A clayey silt/silty clay layer was encountered

FIGURE 13
(refer to fig. 9)



Profile Based On Available Information And WCC's Interpretation Of That Information

SUBSURFACE PROFILE
RICHLAND COUNTY LANDFILL
EMPIRE DETROIT STEEL

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: MWK	SCALE in FEET	DATE: 29 Sept. 81
CHECKED: KCM		JOB: 81C8027

first, ranging from 17 to 30 feet deep. It also contained varying quantities of silt, clay, sand, gravel and rock fragments. This till consists of rock from as far away as Canada. Very thin (up to 1/8 inch thick) seams of fine sand also were noted. The fine-grained soils were generally classified as low plasticity, silty clay soils, although one boring encountered a layer of sandy silt to depth of 7 feet.

b) Sand and Gravel

Underlying the fine-grained cap in all borings was a granular layer composed of silty sand and gravel with varying quantities of clay. To the south, the bedrock is encountered at a depth of 31 feet. The thickness of this layer was variable in the borings. In all borings, the granular layer was wet, indicating the presence of ground water.

c) Layered System

Undulying the uppermost granular layer (except the boring already striking the bedrock, #2) were layers of fine-grained soils, predominantly silty sands and gravels. The layers varied from 2 to 10 feet in thickness and were generally interbedded with sands in the clay soils and clay in the sandy soils.

d) Bedrock

The bedrock was previously described. The borings again indicate the presence of a buried glacial valley, with one wall running along the southern part of the landfill. The wall appears to run from the west to the east, roughly.

The soil transition appears to be gradual between layers. (Modified from Woodward-Clyde Consultants, 1981, p. 9, 10)

HYDROGEOLOGIC SETTING

From the topgraphic map included with Appendix B, it is seen that the highest part of the landfill is at the eastern edge, adjoining the runway. The lowest point occurs along the southern part of the site. The manmade slope of the runway is steeper than the otherwise gentle slope of the landfill, from the northeast to the southwest. The regional contours show a gentle slope, from the northeast of the immediate area to the southwest. Since the water table gradient subtly follows the topography, the groundwater flow in the area is toward the southwest.

Due to the probable formation of a mound of water beneath the landfill, this southward flow is distorted. The radial flow from the mound, superimposed on the normal ground water gradient, accounts for the westerly groundwater flow in the northern portion of the landfill. The southern portion of the landfill shows a southwesterly groundwater flow (Woodward-Clyde Consultants, 1981, p. 11).

Laboratory tests show the upper, clayey soil has a permeability of about 2×10^{-8} cm./sec. (about 0.25 inches/year) (Woodward-Clyde Consultants, 1981, p. 12). However, due to the end morainal nature of the soil, there will be lenses and layers of relatively permeable granular soils, which may be hydroulically connected horizontally and vertically. Any layers allowing faster movement in the generally clayey till will decrease the filtering of the leachate. Once the leachate is in the granular or layered underlying soils, its movement

will be relatively rapid. It is highly probable that a portion of the sandstone aquifer recharge is from this flow, under the landfill, towards the buried valley wall of the Blackhand sandstone.

HISTORY OF THE LANDFILL

In 1952, up to 20 feet of soil was removed from the future landfill area to build the airport runway overrun embankment. The area was surveyed in 1969, and a plan submitted to the County Department of Health for a license. A topographic map from 1969 shows the area as swampy, with some standing water. The plan was approved and the landfill went into operation in 1970 (Woodward-Clyde Consultants, 1981, p. 1). As new federal and state regulations were passed, the landfill was relicensed. Currently the Richland County Landfill is operating under a permit issued by the Ohio Environmental Protection Agency (Woodward-Clyde Consultants, 1981, p. 1). Originally, the southern part of the landfill was to be reserved for industrial wastes, but, in fact, was mostly filled with municipal wastes.

The southern portion of the landfill was filled and ceased operation in 1977, and from then till the present the northern and central part of the site have been in use.

The southern area was worked as an area fill (Woodward-Clyde Consultants, 1981, p. 3). It is probable that the land surface was excavated prior to filling with refuse, to provide the cover material.

The present operating procedure is to excavate a trench, which is filled with refuse on a daily basis, and, when full is covered and graded (Figure 14). Some of the areas in the

FIGURE 14

This picture shows a refuse trench, half full, located near the northern boundary of the landfill.

FIGURE 15

This picture shows an area cut, filled and partially covered in the central part of the landfill. Cover material piles can be seen. The picture is taken looking eastward at the runway.

northern area were filled. The areas already filled have been graded, producing gentle slopes from the northeast to the southwest (Figure 15). Various piles of the excavated till are located about the landfill to be used as daily and final cover.

Runoff water from the runway and the landfill is collected in a series of drainage swales and channeled towards a drainage ditch that exists along the western edge of the landfill (Figure 16). This water in the drainage ditch flows from the landfill southwesterly towards the Rocky Fork Creek, which flows approximately 1/3 mile south of the landfill, just north of and thru Mansfield.

HAZARDOUS WASTE STORAGE

In 1974, due to federal air pollution laws, Empire-Detroit Steel was forced to install scrubbers on its smokestacks. There were no more brown sunsets, but there was a problem of where to dump the emission control dust, composed of cadmium and lead. Originally these heavy metals were mixed with municipal waste and dumped in the general landfill area, in the southern portion of the landfill until it was closed in 1977, and then in the northern area. On 19 November 1980, the Resource Conservation and Recovery Act (RCRA) of 1976 became effective, and in response to this law a separate hazardous waste cell was created within the landfill (Woodward-Clyde Consultants, 1981, p. 1). From that date until early 1984 all of the hazardous waste dust from Empire-Detroit Steel, Globe Steel Abrasive Co., Mansfield Products Inc., and Ohio Steel Tube Inc. was placed in these cells.

FIGURE 16

This picture shows the drainage ditch where it runs in a north-south line along the west edge of the landfill, near the northern border.

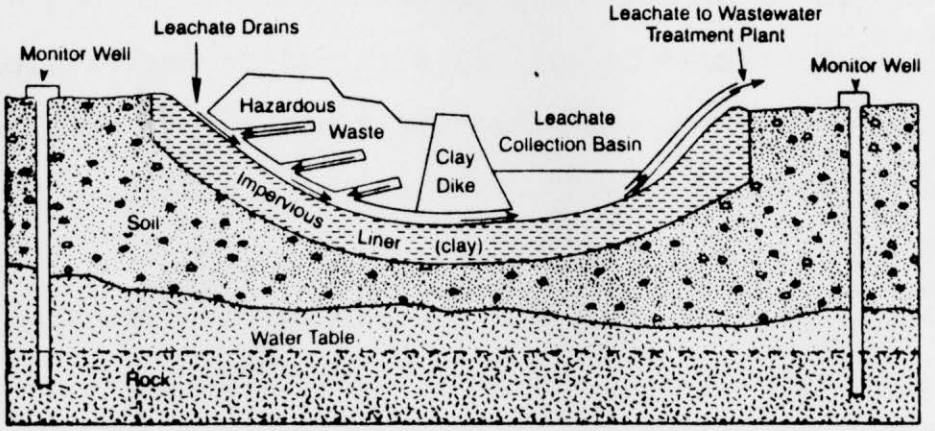


FIGURE 17
Idealized diagram of the secure landfill for hazardous chemical waste. The impervious liner and systems of drains are an integral part of the system to insure that leachate does not escape from the disposal site.

(AFTER KELLER, 1982, p. 281)

In part A of the RCRA Interim States Permit application filed on 18 November 1980, 4 E.P.A. hazardous waste streams were identified as being disposed of at the landfill (Woodward-Clyde Consultants, 1981, p. 1). These streams were: the emission control dust, wastewater sludge from electroplating operations, sludge from lime treatment of spent pickle liquor from steel finishing operations, and barium resulting from paint residue. The lime treated sludge has since been delisted as a hazardous waste.

A site inspection by the Ohio E.P.A. of the Richland County landfill was made in March 1981 (Woodward-Clyde Consultants, 1981, p. 2). The Ohio EPA concluded that the landfill was a marginal site, and that a hydrogeologic study of the site would be needed for new licensing. The site had no monitoring wells, though they should have been installed in 1980 when RCRA became effective. The landfill was allowed to continue the hazardous waste operation under a conditional permit that allowed no new hazardous waste.

Empire-Detroit Steel paid for a study by Woodward-Clyde Consultants, of the hydrogeologic conditions of the area. Five monitoring wells were drilled in the area, as shown in Appendix D. The landfill needs a minimum of 5 wells; one upgradient of the site (to the northeast), one well in the middle of the landfill, and three wells down gradient of the site, to the west and south (Woodward-Clyde Consultants, 1981, p. 15). The upgradient well serves as a control well, giving background water quality. The center well would establish any leachate movement, and the down-gradient wells would show the quality of the water moving away from the landfill, toward

the area aquifer. The heavy metals are a potential threat to the area water supplies.

The wells also provided information on the water table in the landfill. In the past, the landfill workers would dig or drill a hole until they reached water, then they back filled in order to isolate the trenches from the watertable (News Journal, 9-4-81, p. 3).

The Monitoring wells were drilled into the shallow overburden, the shallow aquifer of the area, while the water wells in the area, even the domestic wells, are drilled into the sandstone aquifer. Because of this the monitor wells are not really checking the water used in the area. Deeper wells need to be sunk. It is possible that the heavy metals are flowing below the level of the monitoring wells.

The wells were paid for by Empire-Detroit, independent of the EPA, but the EPA monitors the landfill twice a year (News-Journal, 1-22-82, p. 1).

The results of tests done of the groundwater samples from the monitoring wells is given in Appendix E. The worst figures are found in the well in the middle of the landfill. The Barium level is high, but otherwise the well shows numbers that are normal for a solid waste disposal site. The elevated chloride, sulfate and phenols contamination are mostly nuisance values, and are usual values for a sanitary landfill. So far no unacceptable levels of contamination have turned up outside of the landfill. The site will continue to be monitored, even once the landfill is closed, for 30 years (News Journal, 5-24-84, p. 3).

The county was eager to accept the hazardous waste at

the landfill, it allowed the site to run at a profit. However, the hydrological study of the site (Woodward-Clyde Consultants, 1981, p. 15) showed the geology of the landfill to be inadequate for a hazardous waste disposal site. The Woodward-Clyde study showed a need to construct a secure wall to handle 2 year's worth of the emission control dust would cost $200,000 to build, plus the costs of treating the leachate, and the cost of additional monitoring well (News Journal, 11-28-82, p. 1B). Empire-Detroit had been paying $15.70 per ton to dump the dust at the landfill, but in order to pay for the necessary upgrading of the landfill, the dumping cost would rise to $37.50 per ton (News Journal, 12-28-82, p. 3A). The county must also establish a $125,000 trust fund for closure costs of the landfill, and the EPA required groundwater tests could run $300,000 a quarter (News Journal, 12-28-83, p. 3A). Empire-Detroit dumped an estimated 7000 tons of emission control dust, out of the total 7250 tons dumped at the landfill, so it would be liable for the bulk of the expenses.

The landfill was given permission by the Ohio EPA to fill the last toxic waste trench. Six more months worth of dust wasn't considered to increase the potential threat, even though the trench had been improperly placed. The trench was constructed next to an older hazardous waste trench, and it should have been built further away. This trench was filled in February, 1984 (News Journal, 1-11-84, p. 3). Since this time, the hazardous wastes have been trucked to a disposal site near Toledo. The cost of dumping at the landfill became prohibitive. The other dumpers were forced to follow suit.

According to Thacker (personal communication), lead and cadmium may be taken off of the Federal hazardous waste list. These heavy metals appear to be absorbed by the clay soils, and do not appear to be a hazard to the area groundwater. The absorption of these heavy metals are now being researched, but no conclusion has yet been reached.

The landfill will continue to be monitored, and if contamination of the groundwater is detected, clean up measures will have to be taken. These may involve the building of a slurry wall, putting wells in the area to pump the contaminated water from the aquifer and treating it, and the modifications of the landfill to improve the cover and leachate control.

The area is and was not suitable for a hazardous waste landfill, and no more toxins will be dumped there in the future, but to whatever extent, the damage is done, and will necessitate scouting for many years.

FUTURE OF THE LANDFILL

The Richland County Landfill is fast running out of area to dump the refuse. The landfill should be completely filled as of August, 1984 (News Journal, 5-24-84, p. 2). A new area needs to be found.

One possibility was an expansion of the current landfill to the west (refer to Figure 9). According to Phil Prehle of the Richland Engineering (News Journal, 8-11-81, p. 3), the area was composed of too sandy a soil, too much sand and gravel was present as lenses and layers, and the soil zone above the bedrock was too shallow for the site to qualify as a sanitary landfill.

The county commissioners are currently discussing new landfill sites, and alternative waste disposal schemes, but as of yet, there has been no action taken. To do a proper site evaluation for a sanitary landfill, o-k-ing it, buying the land, getting a license, and opening shop can be a process that may take 2 or 3 years to complete. So far, this fact has not impressed the commissioners. A Mansfield News-Journal cartoon depicting the county commissioners is at the front of this report.

The landfill will continue to be monitored for groundwater quality for up to 30 years due to the hazardous waste disposal of these. Currently, it is planned to be graded and seeded and lie fallow when filled.

LIMITATIONS

This paper was primarily a library research paper, with only informal visits to the landfill itself. It would have been interesting and informative to build a model of the soils found at the landfill, and chart the path of the heavy metals thru the soils. Unfortunately, I had neither the knowledge nor time to construct and carry out such an experiment.

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APPENDIX A

Ohio Solid Waste Disposal Regulations

OHIO SOLID WASTE DISPOSAL REGULATIONS

(Ohio Administrative Code, Regulations 3745-27 and 3745-37, Recodified January 31, 1977, Formerly EP-20 and EP-33; Adopted June 23, 1976; Effective July 29, 1976)

3745-27-01 *DEFINITIONS*

As used in these Chapters, 3745-27 and 3745-37,

(A) "Board of Health" means the Board of Health of a city or general health district, or the authority having the duties of a Board of Health in any city as authorized by Ohio Revised Code Section 3709.05.

(B) "Cell" means compacted waste materials in a sanitary landfill that are enclosed by cover material.

(C) "Composting" means the controlled biological decomposition of organic solid wastes under aerobic conditions. For purposes of these Chapters, 3745-27 and 3745-37, composting shall be considered a form of solid waste disposal.

(D) "Director" means the Director of the Ohio Environmental Protection Agency.

(E) "Facility" means any site, location, tract of land, installation, or building used for incineration, composting, sanitary landfilling, or other methods of disposal of solid waste.

(F) "Floodway" means the channel of the watercourse and those portions of the adjoining flood plains which are required to convey the regional 100 year flood.

(G) "Ground water" means any water below the surface of the earth in a zone of saturation.

(H) "Hazardous wastes" means those substances which, singly or in combination, pose a significant present or potential threat or hazard to human health or to the environment, and which, singly or in combination, require special handling, processing, or disposal, because they are or may be flammable, explosive, reactive, corrosive, toxic, infectious, carcinogenic, bioconcentrative, or persistent in nature, potentially lethal, or an irritant or strong sensitizer.

(I) "Health Commissioner" means the individual occupying the office created by ORC Secs. 3709.11 and 3709.14, or his authorized representative.

(J) "Health district" means a city or general health district as created by or under authority of ORC Chapter 3709.

(K) "Incinerator" means any equipment, machine, device, article, contrivance, structure, or part of a structure used to burn solid wastes.

(L) "Leachate" means the substance that results when any liquid percolates through solid waste and extracts dissolved or suspended materials from it.

(M) "Open dumping" means the depositing of solid wastes into waters of the state, and also means the final depositing of solid wastes on or into the ground at any place other than a solid waste disposal site or facility operated in accordance with ORC Chapter 3734 and these Chapters, 3745-27 and 3745-37.

(N) "Nuisance" means anything which is injurious to human health or offensive to the senses; interferes with the comfortable enjoyment of life or property; and affects a community, neighborhood, or any considerable number of persons (although the extent of annoyance or damage inflicted upon individual persons may be unequal).

(O) "Operator" means the person responsible for the direct control of operations at a solid waste disposal facility.

(P) "Owner" means the person who holds title to the property on which the solid waste disposal facility is located.

(Q) "Person" means the state, any political subdivision, public or private corporation, individual, partnership, or other entity.

(R) "Regulatory Floodplain" means a watercourse and the areas adjoining a watercourse which have been or may be covered by a regional flood (100 year flood). The regulatory floodplain includes the floodway and the fringe areas of the floodplain outside the floodway.

(S) "Resource Recovery" means the extracting, removing, or reclaiming of valuable materials and/or energy from solid wastes.

(T) "Sanitary landfill" means a land disposal site employing a method of disposing of solid wastes on land in a manner intended to minimize environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume, and applying and compacting cover material daily.

(U) "Solid wastes" means such unwanted residual solid or semisolid material as results from industrial, commercial, agricultural, and community operations, excluding earth or material from construction, mining, or demolition operations, and slag and other substances which are not harmful or inimical to public health, and includes, but is not limited to, garbage, combustible and non-combustible material, street dirt, and debris.

For purposes of this definition, "material from construction operations" and "material from demolition operations" are those items affixed to the structure being constructed or demolished, such as brick, concrete, stone, glass, wallboard, framing and finishing lumber, roofing materials, plumbing, plumbing fixtures, wiring, and insulation material.

For purposes of this definition, solid wastes include bulky items such as automobiles, furniture, bed springs, and large appliances.

For purposes of this definition, "semisolid" means that the material in question, while cohesive and viscous, slowly flows or loses its shape when unconfined, and does not readily release liquids, under normal climatic conditions.

(V) "Solid waste disposal" means the final disposition of solid wastes.

(W) "Surface water" means any water on the surface of the earth.

(X) "Unwanted material" means a substance generated by an activity, entity, or person who wishes to be rid of said substance.

(Y) "Waste materials" means solid wastes, hazardous wastes, and any other substances being disposed of at a solid waste disposal facility.

(Z) "Water pollution" means

(1) in the case of any surface waters of the state, entrance of any substance into such waters in such quantities as to cause a violation of any water quality standards set forth in 3745-1 of the Regulations of the Ohio EPA, or any violation of ORC Sec. 1531.29; and

(2) in the case of any underground waters of the state, the entrance of any substance into such waters in such quantities as to prevent or materially interfere, either immediately or cumulatively, with any use of such waters otherwise possible, or in such quantities as would require such waters to be treated prior to use.

(AA) "Water table" means the upper surface of the zone of saturation.

(BB) "Waters of the state" means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, which are situated wholly or partly within, or border upon, this state or are within its jurisdiction, except those private waters which do not combine or effect a junction with natural surface or underground waters.

(CC) "Working face" means that portion of a sanitary landfill where solid wastes are unloaded, spread, and compacted prior to placement of cover materials.

3745-27-02 *RELATION TO OTHER PROHIBITIONS*

No provision of these Chapters, 3745-27 and 3745-37, shall exempt any person from compliance with any section of the Ohio Revised Code, or any regulation of any federal agency, or of any department of the state government, including the Ohio Department of Health and the Ohio Department of Natural Resources.

3745-27-03 *EXEMPTIONS*

These Chapters, 3745-27 and 3745-37, shall not apply to

(1) solid wastes generated on the premises of a single family residence, and disposed of on the premises where generated, or

(2) the temporary storage of solid wastes. For purposes of these regulations, temporary storage of putrescible solid wastes in excess of seven days, or temporary storage of any solid wastes in such quantities or in such a manner that, in the judgment of the Health Commissioner or the Director or his authorized representative, such storage causes a nuisance or a health hazard, shall be considered open dumping.

(3) vehicles used for hauling solid wastes, or

(4) sites and facilities for feeding garbage to swine or poultry, and governed by Ohio Revised Code Chapter 942, or

(5) incinerators located on the premises where the wastes incinerated are generated, or

(6) resource recovery facilities, or such other solid waste processing facilities as shredders, pulverizers, balers, or transfer stations, or

(7) any "junk yard", "automobile graveyard", or "scrap metal processing facility", as defined by ORC Section 4737.05. This exemption shall not be construed to include sanitary landfills or garbage dumps.

(8) pond or lagoon operations regulated under ORC Chapter 6111.

3745-27-04 *COMPLIANCE WITH THIS CHAPTER 3745-27, BY SOLID WASTE DISPOSAL FACILITIES NOT SUBJECT TO CHAPTER 3745-26 [repealed]*

(A) Except as Regulation 3745-27-09 (C) provides the contrary, if no waiver application is submitted in accordance with Regulation 3745-27-11(I), the solid waste disposal facility shall attain full compliance with this Chapter, 3745-27, not later than the deadline set forth in Regulation 3745-27-09 (K) (1).

(B) If a waiver application is submitted in accordance with Regulation 3745-27-11 (I), the solid waste disposal facility shall attain full compliance with all provisions of this Chapter, 3745-27, from which no waiver was sought, not later than the deadline set forth in Regulation 3745-27-09 (K) (1).

(C) If a waiver application submitted in accordance with Regulation 3745-27-11 (I) is denied, the facility shall attain full compliance with the provisions of this Chapter, 3745-27, from which the waiver was sought, not later than ninety days after such denial becomes effective.

3745-27-05 *AUTHORIZED, LIMITED, AND PROHIBITED SOLID WASTE DISPOSAL METHODS*

(A) Solid wastes shall be disposed of only by the following methods or combination thereof:

(1) Sanitary landfill, or

(2) Incineration, or

(3) Composting, or

(4) Methods not mentioned by paragraphs (1) through (3) above and not prohibited by this Chapter, 3745-27, provided that such methods are demonstrated to the satisfaction of the Director to be capable of disposing of solid wastes without creating a nuisance or a health hazard, without causing water pollution, and without violating these regulations and any regulation adopted by the Director pursuant to Ohio Revised Code Chapter 3704 (Air Pollution Control).

(B) Solid waste disposal by means of open burning, as defined in Chapter 3745-19 of the Regulations of the Ohio EPA, is permitted only as provided therein.

(C) No person shall conduct, permit, or allow open dumping.

3745-27-06 *SOLID WASTE DISPOSAL FACILITY PLAN APPROVAL*

(A) After July 29, 1976, any person proposing to establish a new solid waste disposal facility, or proposing to substantially modify an existing solid waste disposal facility, and who is required to submit plans by Ohio Revised Code Chapter 3734, or is required by Chapter 3745-31 of the Regulations of the Ohio EPA to obtain a Permit to Install for such establishment or modification, shall submit to the Director in triplicate detail plans, specifications, and information relating to the facility, and may submit waiver applications as provided in Regulation 3745-27-11. Any revision or alteration of the items required by the preceding sentence shall also be submitted in triplicate.

Such detail plans, specification, and information shall be drawn up in a manner acceptable to the Director or his authorized representative in detail sufficient to allow clear understanding and intelligent review thereof, and to provide assurance that the site or facility is designed and will be operated in accordance with these Chapters, 3745-27 and 3745-37. The method of operation of the site or facility shall be described by the detail plans, specifications, and information with such a degree of detail and clarity as to be readily understandable by operating personnel at the facility.

Detail plans, specifications, and information required for a modification, as defined in Regulation 3745-31-01 (E), of a sanitary landfill shall contain such data described in paragraphs (B) through (D) below relating to the proposed modification as the Director deems necessary to determine whether the criteria set forth in paragraphs (H) and (I) below are satisfied.

The person submitting the plans or any revision or alteration thereof shall send one copy of the plans by certified mail to the Board of Health of the Health District wherein the facility will be located, within seven days after submitting such items to the Director. The Director shall send one copy of the plans as approved to the Board, shall return a copy to the person submitting them, and shall retain the third copy in his files.

(B) Detail plans, specifications, and information for sanitary landfills required by paragraph (A) above shall show by means of drawings on 24" by 36" paper, and, except where otherwise indicated, by narrative descriptions at the margins of said paper:

(1) Such identification information as

(a) the name of the sanitary landfill; and

(b) the precise geographical location and boundaries of the sanitary landfill, which shall be indicated on a 7-1/2" USGS topographical map and by a legal description; and

(c) the name and address of the operator of the sanitary landfill; and

(d) the name and address of the owner(s) of the land to be used for the sanitary landfill; and

(e) the name and address of the person who prepared the plans; and

(2) Such site information as

(a) all land owned, leased, or proposed to be leased or purchased for the site; and

(b) all existing land uses on or within 1000 feet of the site; and

(c) all public roads, access roads, communities, and habitable buildings on or within 1000 feet of the site; and airport runways within 10,000 feet of the site (5000 feet if used only by propeller-driven aircraft) (runways may be projected on a scale insert); and

(d) the location of all existing or proposed maintenance buildings, weighing facilities, storage buildings, and buildings for the shelter or other use of employees; and

(e) the location of existing or proposed utilities, including water, sewerage and sewage treatment, electricity, gas, and telephone or other means of communication; and any utility company easements on or bordering upon the site; and

(f) the location of any water, oil, or gas wells; strip mines; or deep mines; within 2000 feet of that portion of the site where waste materials are to be deposited; and the current status of each, including depth, use, and, where applicable, abandonment date.

In the case of mines, the plans shall be accompanied by a letter from the Ohio Division of Mines or other appropriate agency, verifying type, location, and status. In the case of water wells, other sources of water available to each user shall be shown.

(g) the limits of the regulatory flood plain, if applicable; and

(h) all fencing, gates, and natural or other screening on the site (may be shown on an aerial photograph); and

(i) existing topography, topography of the area within 1000 feet of the site, maximum depths of excavations, and final topography, with clear indications showing all portions of the site where waste materials are to be deposited. The scale on drawnings required by this paragraph shall be a maximum of 1 inch = 200 feet, and contour lines shall have intervals no greater than five feet.

(j) the location and typical cross-section of all on-site roads, and vertical profiles of each road, showing maximum grades; and

(3) Such hydrogeologic and surface drainage information as

(a) the direction of flow and points of concentration of all surface waters on the site; and

(b) draninage plans, which shall show

(i) grades; and

(ii) diversion trenches; and

(iii) special drainage devides to be used for control of surface erosion, and for disposition of ground water which outlets within the site; and

(c) a complete log (description) of each boring made during the exploratory program (may be presented in an accompanying report) showing:

(i) the location, depth, surface elevation, and water level measurements of all borings; and

(ii) textural classification (Unified Soil Classification System — USCS); and

(iii) grain size distribution curves for representative samples of each group of borings of similar soil composition; and

(iv) coefficient of permeability, based on field and/or laboratory determinations; and

(d) depth, lithology (physical character), and hydrologic characteristics of the bedrock formations encountered during the boring operations and/or which crop out on or adjacent to the site (may be presented in an accompanying report) and

(e) the following information relating to the ground water (may be shown in accompanying report)

(i) the depth to maximum elevation of ground water; and

(ii) direction of the flow of ground water; and

(iii) ground water development potential of the underlying aquifer system(s); and

(iv) the following information on existing ground water quality, determined by laboratory analysis of such a number of samples from such a number of wells as the Director or his authorized representative deems necessary to determine existing ground water quality in the area:

(I) Temperature (measured at the time sample is collected); and

(II) Conductivity; and

(III) pH; and

(IV) Total Alkalinity; and

(V) Ammonia Nitrogen; and

(VI) Total Kjeldahl Nitrogen (TKN); and

(VII) Nitrate Nitrogen; and

(VIII) Sulfate (SO4); and

(IX) Chloride (Cl); and

(X) Total Dissolved Solids (TDS); and

(XI) Calcium (Ca); and

(XII) Magnesium (Mg); and

(XIII) Sodium (Na); and

(XIV) Iron (Fe); and

(XV) Chemical Oxygen Demand (COD); and

(XVI) Total Organic Carbon (TOC); and

(XVII) Methylene Blue Active Substances (MBAS)

All monitor wells installed pursuant to this Regulation, 3745-27-06, shall conform to Chapter 3745-9 of the Regulations of the Ohio EPA.

(4) Such operational information as

(a) the direction of the preveilaing winds during each season; and

(b) the types of waste materials that will be received (e.g., residential, commercial, industrial, hazardous, construction, demolition, mining, agricultural, other), and the anticipated average weekly quantity of each type. Semi-solid, liquid, and hazardous wastes shall be described in detail.

(c) (i) methods of unloading waste materials from transportation vehicles on the site; and

(ii) methods of on-site handling of said waste materials; and

(iii) traffic patterns on the site; and

(iv) disposal methods; and

(v) the systematic use of the portions of the site where waste materials are to be deposited, including the location, size, and order of use of trenches and backfill areas; and

(vi) typical cross sections of the completed cells; and

(vii) typical cross section of the site. A minimum of one cross section for each 300' of length and width shall be shown.

(d) (i) the USCS textural classification and estimated quantity of the cover material on the site; and

(ii) the USCS textural classification and estimated quantity of any cover material to be brought from off site; and

(iii) the location of the cover material before operations; and

(iv) the handling, movement, stockpiling, and placement of the cover material during operations; and

(e) such equipment information as

(i) weights and types of equipment to be used to operate and maintain the facility; and

(ii) the availability of any standby equipment, and/or an adequate contingency plan for the proper handling and disposal of waste materials in case of equipment failure; and

(iii) for each piece of equipment listed in (i) above, the maximum period of equipment down time before any standby equipment is placed into service, and

(f) areas and procedures to be used for disposal of waste materials during inclement weather; and

(g) detailed description of any salvaging or resource recovery operations to take place at the facility; and

(h) use of that portion of the site where waste materials are not to be deposited; and

(i) hours of operation; and

(5) Such control information as

(a) locations, surface elevation, depths, construction details, materials penetrated, water levels, available reports on, future plans for chemical sampling, and other relevant characteristics of all monitor wells to be used for ground water sampling and detection of leachate production and migration, where such wells are required by the Director or his authorized representative; and

(b) such measures for the collection, containment, treatment or disposal of leachate as may be required by the Director to prevent water pollution; and

(c) measures to be utilized for control of fire, dust, gas, scavenging, erosion, and blowing debris; and

(6) Such closure information as

(a) how the portion of the facility where waste materials were not deposited will be blended in with the finished area where waste materials were deposited; and

(b) how the site will be closed. This information shall include descriptions of

(i) composition, depth, and placement of final cover material; and

(ii) final grades, which shall be a minimum of 1 percent and a maximum of 25 percent; and

(iii) maximum height of the completed fill; and

(iv) vegetative cover to be established; and

(v) means by which access to the site will be limited; and

(vi) provisions for corrective measures in case of settling, fire, gas migration, or leachate formation; or erosion

of final soil and vegetative cover after site closure; and

(vii) intended use of the site after closure, if known.

(C) Detail plans, specifications, and information required by paragraph (A) above shall show on 8 1/2" x 11" paper:

(1) reports from such other agencies as the Director may require; and

(2) in the case of sanitary landfills, calculations showing the anticipated amount of cover material on the site; and

(3) in the case of sanitary landfills, calculations showing the anticipated capacity of the sanitary landfill.

(D) At the time of submission to the Director of detail plans, specifications, and information required by paragraph (A) above, there shall be submitted to the Director:

(1) letter(s) of acknowledgement from:

(a) the owner or lessee of any easement or right of way adjacent to or running through the facility concerning the excavation, building, or travelling over or next to the easement; and

(b) the local zoning authority having jurisdiction over the geographical area wherein the facility is situated, if any; and

(2) copies of letters of intent to

(a) the Board of Health of the Health District wherein the proposed site or facility is located; and

(b) the governments of the general purpose political subdivisions wherein the site or facility is situated, i.e., County Commissioners, legislative authority of a municipal corporation, or the Board of Township Trustees; and

(c) the Regional Solid Waste Planning Agency, if any; and

(d) the Federal Aviation Administration, if applicable; and

(e) the Garbage and Refuse Disposal District having jurisdiction over the facility, if any; and

(f) any agencies required to be notified by ORC Chap. 713; and

(g) the conservancy district wherein the facility is situated, if any which letters shall notify the owner, agency, district or political subdivision of the intent to establish a solid waste disposal facility, and which shall state the exact location and legal description of the area proposed for development; and

(3) a notarized statement that, to the best of the knowledge of the person who prepared the plans, the detail plans, specifications and information are true and accurate.

(E) Copies of agreements or contracts for standby equipment or cover material shall be forwarded to the Director and the Board of Health within 30 days of the signing thereof.

(F) If detail plans, specifications, and information submitted to the Director or his authorized representative do not conform to paragraphs (A) through (D) above, the Director or his authorized representative may, within 60 days of receipt thereof, notify the person submitting said plans of the nature of the deficiency, and of the Director's refusal to consider the plans until the deficiency is rectified. If the Director is satisfied that, notwithstanding their deficiency, the detail plans, specifications, and information are sufficient to determine whether the criteria set forth in paragraphs (H) and (I) below will be satisfied he shall consider and act upon such detail plans, specifications, and information notwithstanding their deficiency.

(G) If the Director or his authorized representative determines that information in addition to that required by paragraphs (B) through (D) above is necessary to determine whether the criteria set forth in paragraphs (H) and (I) below are satisfied, he may require that the person submitting the plans supply such information as a precondition to further consideration of the detail plans, specifications, and information.

(H) The Director shall not approve any detail plans, specifications, and information unless he determines that:

(1) establishment or modification and operation of the solid waste disposal facility will not create a nuisance or a health hazard, will not cause water pollution, and will not violate any regulation adopted by the Director under ORC Chapter 3704; and

(2) in the case of plans submitted by a person who has previously operated or is currently operating one or more solid waste disposal facilities, such person has operated such facilities in accordance with applicable provisions of ORC Chap. 3734; these Chapters, 3745-27 and 3745-37 and/or Chapter 3745-26 [repealed], in the course of such previous or current operations; and

(3) the person identified as the operator of the solid waste disposal facility is competent and qualified to operate the solid waste disposal facility in accordance with ORC Chap. 3734 and these Chapters, 3745-27 and 3745-37; and

(4) the solid waste disposal facility will be capable of operation in accordance with Regulations 3745-27-07, 3745-27-08, and 3745-27-09, and with the terms and conditions of waivers granted for the facility under Regulation 3745-27-11; and

(5) the sanitary landfill is not located in a floodway.

(I) Except by means of a waiver granted under 3745-27-11, the Director shall not approve plans for a sanitary landfill under any of the following conditions:

(1) the sanitary landfill will be located in a regulatory floodplain outside of a floodway; or

(2) the sanitary landfill will be located in a sand or gravel pit; or

(3) the sanitary landfill will be located in a limestone quarry or a sandstone quarry; or

(4) those portions of the sanitary landfill where waste materials are to be deposited will be located within 1000 feet of a water well in existence on the date the plans were received by Ohio EPA; or

(5) those portions of the sanitary landfill where waste materials are to be deposited will be located within 200 feet of a stream or lake; or

(6) the seasonal high ground water table and the lowest level of waste materials in the sanitary landfill will be separated by less than 5 feet of soil of low permeability; or

(7) the seasonal high ground water table will be less than 5 feet below the existing surface of the site.

(J) Appeals from disapproval of detail plans, specifications, and information may be made only in accordance with Chapter 3745-47 of the Regulations of the Ohio EPA.

3745-27-07 *INCINERATOR AND COMPOSTING OPERATIONS*

(A) The operator shall insure that all waste materials delivered to the incinerator are placed into the charging pit as soon as practicable, except waste materials not intended to be incinerated.

(B) All incinerators shall be operated in strict compliance with Ohio Revised Code Chapters 3704 and 6111 and all regulations adopted by the Director pursuant to those Chapters.

(C) The site for and method of incinerator residue disposal or use shall be approved by the Director in order to insure that the method of disposal or use will not cause water pollution, create a nuisance or a health hazard, or violate any regulation adopted by the Director pursuant to ORC Chap. 3704.

(D) Waste materials intended for composting shall be maintained in a condition free of nuisance, insects, and rodents prior to, during, and after the composting operation.

3745-27-08 *OPERATION OF SOLID WASTE DISPOSAL FACILITIES*

(A) All operations at solid waste disposal facilities shall be conducted in strict compliance with approved detail plans, specifications, and information; the terms and conditions of the permit to install issued under Chapter 3745-31 of the Regulations of the Ohio EPA; and the solid waste disposal license issued under Chapter 3745-37; and the terms and conditions of any waivers granted under Regulation 3745-27-11.

(B) All weather access roads shall be constructed and maintained in such a manner as will withstand the anticipated degree of use and allow passage of loaded refuse vehicles at all times, with minimum erosion and dust generation.

(C) The operator shall not permit access to the facility by persons other than employees of the facility except during operating hours when operating personnel are present. The operator shall at all times limit access to the facility as necessary to prevent scavenging, or salvaging operations not conducted in accordance with paragraph (J) below, and as necessary to prevent interference with proper operating procedures. This paragraph shall not apply to the Health Commissioner nor to the Director or his authorized representative, who upon proper identification may enter the facility at any reasonable time, subject to safety requirements.

(D) The operator of a facility shall not admit waste materials to any area of the facility until all site preparations for that area have been completed, all necessary equipment brought to the facility, the facility adequately prepared for operation, and the prepared site inspected by the Health Commissioner and approved by the Director or his authorized representative.

(E) The operator shall confine unloading of waste materials to the smallest practical area and shall insure that unloading is supervised by competent operating personnel.

(F) The operator shall employ all reasonable measures to collect, properly contain, and dispose of scattered litter, including the use of portable wind screens where necessary, and frequent policing of the area.

(G) The operator shall manage the facility in such a manner that noise, dust, and odors are strictly controlled so as not to cause a nuisance or a health hazard.

(H) The operator shall manage the facility in such a manner that the attraction, breeding, and emergence of insects, rodents, and other vectors are strictly controlled so as not to cause a nuisance or a health hazard. The operator shall initiate supplemental effective vector control measures as deemed necessary by the Health Commissioner or the Director or his authorized representative.

(I) The operator shall operate the facility in such a manner that operation does not create a nuisance or a health hazard, and does not cause water pollution, or violate any regulation adopted by the Director pursuant to Ohio Revised Code Chapter 3704.

(J) Salvaging may be conducted only in a manner specified in plans submitted to and approved by the Director.

(K) The operator shall exclude live domestic and farm animals from the operating areas of the facility, except for animals employed for security purposes.

(L) The operator shall have adequate fire control equipment , material, and services available at or to the facility, and shall act immediately to control or extinguish any fire.

(M) The operator shall keep a daily log of operations of the facility. Logs shall be on forms prepared by the Director. All entries required by the log form shall be made. A copy of the log shall be available for inspection by the Health Commissioner and the Director's authorized representative during normal operating hours. When required by the Director or his authorized representative, log forms or summaries of daily logs shall be submitted to the Health Commissioner and/or the Director on forms prepared by the Director.

(N) All operations at solid waste disposal facilities shall be carried out by individuals who are thoroughly familiar with proper operational procedures therefore, and with the approved detailed plans, specifications, and information.

(O) A copy of the approved detail plans, specifications, and information shall be available, and may be inspected by the Health Commissioner or the Director or his authorized representative during normal operating hours.

(P) The operator shall insure that operable equipment adequate in size and quantity for the operations of the facility will be available at all times, or that an appropriate contingency plan is prepared to properly handle and dispose of waste materials in case of equipment failure.

(Q) Vegetation occurring on the site shall be cleared only to the extent necessary for proper operation of the facility.

3745-27-09 *SANITARY LANDFILL OPERATIONS*

(A) Temporary roads shall be constructed and maintained on the site in a manner that allows passage of loaded refuse vehicles and other heavy vehicles with minimum erosion and dust generation.

(B) The operator shall make such preparations, that, during inclement weather, the sanitary landfill is able to receive, compact, and cover waste materials in the amounts customarily received. The preparations shall include, but need not be limited to, designation and preparation of areas where waste materials will be deposited, compacted, and covered during inclement weather; construction and maintenance of all-weather roads leading from the point at which loaded refuse vehicles enter the site to the inclement weather areas; and stockpiling of cover material.

(C)(1) No operator of a solid waste disposal facility shall accept sewage solids, semi-solids, or liquids; other semi-solid or liquid wastes; or hazardous wastes, unless detail plans for such disposal have been approved by the Director and a Permit to Install obtained as required by Chapter EP-30 of the regulations of the Ohio EPA. Plans shall be approved only if the applicant demonstrates to the Director's satisfaction that disposal of the above types of waste materials in the manner proposed will not cause water pollution or create a nuisance or a health hazard.

(2) Notwithstanding paragraph (1) above, operators of solid waste disposal facilities which have been accepting sewage solids, semi-solids, or liquids; other semi-solid or liquid wastes; or hazardous wastes in accordance with plans approved by the Director under previous Regulation 3745-26-01(H) [repealed] may continue the disposal of these waste materials in accordance with the approved plans, except for facilities operating under a conditional license, which shall not accept such waste materials.

(3) The Director shall review plans approved under previous Regulation 3745-26-09(H), and may modify or attach additional conditions and requirements to such plans, or may revoke the approval to accept sewage solids, semi-solids, or liquids, other semi-solid or liquid wastes, or hazardous wastes, whenever necessary to prevent water pollution, or the creation of a nuisance or a health hazard.

(4) Whenever plans or detail plans have been approved or permits issued as required in paragraphs (1) and (2) above, all activities authorized thereby shall be conducted in strict accordance with such plans or detail plans and the terms and conditions of such permits, No sanitary landfill shall receive sewage solids, semisolids, and liquids; other semi-solids and liquids; or hazardous materials at rates materially in excess of those specified in the plans, detail plans or permits; or of a materially different character from that specified in the plans, detail plans, or permits.

(5) Facilities subject to 3745-27-09 (K) may submit such detail plans and applications for permits to install with their operational report.

(6) The Board of Health shall be consulted prior to approval of such detail plans and issuance of such permits.

(D) Except as provided in paragraph (E) below, the operator shall insure that all waste materials admitted to the site are deposited at the working face, spread, and well compacted in layers not more than two feet in depth. During periods when inclement weather prevents compliance with the preceding sentence, the waste materials shall be deposited at the area prepared in accordance with paragraph (B) above.

(E) Waste materials that are burning, highly flammable, or at a temperature likely to cause fire shall not be deposited at the working face. Such material shall be deposited in a separate location at a sufficient distance from the working face to prevent fires from spreading to the working face; shall be immediately covered with a sufficient amount of earth or other material, or sprayed with water or other appropriate fire suppressant, in order to extinguish or prevent fire; and shall be placed in a cell when cooled.

(F)(1) A well compacted layer of cover material not less than six inches thick shall be placed over all exposed waste materials by the end of the working day, unless paragraph (2) below applies. In no event shall solid wastes be exposed for more than 24 hours after unloading. Cover material shall be applied more frequently than required by the two preceding sentences if necessary to control fire or fire hazards, blowing litter, odors, insects, or rodents.

(2) A well compacted layer of cover material at least one foot thick shall be applied by the end of the working day to all exposed surfaces of a cell where additional waste materials are to be deposited 30 days or more after completion of the cell.

(3) A well compacted layer of final cover material shall be applied to all exposed surfaces of a cell upon reaching final elevation. The final cover material shall be applied in such amounts that all waste materials are covered to a depth of at least two feet. The completed area shall be seeded with such grasses or other vegetation as will form a complete and dense cover, which seeding shall be done as many times as necessary to insure compliance with this requirement. Weather permitting, application of final cover and seeding shall be accomplished within 60 days of reaching final elevation.

(4) All cover material required by paragraphs (1) through (3) above shall consist of non-putrescible materials having low permeability to water, good compactability, cohesiveness, and relatively uniform texture. Such cover material shall not contain stones, cobbles, boulders, or other large objects in such quantities as may interfere with its application and intended purposes. Suitable cover materials include, but may not be limited to, loam, sandy loam, silty loam, clay loam, silty clay, and sandy clay. Other soil classifications may be used if it can be demonstrated to the satisfaction of the Director or his authorized representative or the Health Commissioner that such other soil classifications may be used if it can be demonstrated to the satisfaction of the Director or his authorized representative or the Health Commissioner that such other soil classifications meet the requirements of this paragraph. In determining whether to allow the use of such other soil classifications, the Director or his authorized representative or the Health Commissioner may require a sieve analysis and/or a permeability test to be conducted.

(G) The operator shall install such a number of monitor wells in such locations as the Director of his authorized representative or the Health Commissioner deems necessary to determine the effect of the facility upon the quality of ground water. Each monitor well and/or such other wells as the Director or his authorized representative or the Health Commissioner deems necessary to determine the effect of the facility upon the quality of ground water shall be sampled semi-annually for the following substances:

(1) Chlorides (Cl)
(2) Chemical Oxygen Demand (COD)
(3) Total Organic Carbon (TOC)
(4) Total Dissolved Solids (TDS)
(5) Methylene Blue Active Substances (MBAS)

Where the Director or his authorized representative or the Health Commissioner determines that a substantial threat of water pollution exists, he may require more frequent sampling, and may require sampling for additional substances.

All monitor wells installed pursuant to this Regulation, 3745-27-09, shall conform to Chapter 3745-9 of the Regulations of the Ohio EPA.

(H) If leachate is detected on the site, or is draining from the site, in such quantities that the Director or his authorized representative or the Health Commissioner believes, based on a review of geologic, hydrologic, engineering, and other factors, that a substantial threat of water pollution exists,

(1)(a) leachate shall be contained on the site and properly treated, or

(b) leachate shall be collected and transported from the site and properly treated, and

(2) action shall be taken to minimize, control, or eliminate the conditions which contribute to the production of leachate.

(I)(1) Surface waters on the site shall be diverted from the portion of the site where waste materials are being or have been deposited. The landfill shall be properly graded and provided with such additional drainage facilities as are necessary to insure minimal percolation of water through the cover material, and minimal erosion of the cover material.

(2) If ponding or erosion occurs on those areas of the site where waste materials are being or have been deposited, the operator shall as soon as weather permits undertake such remedial actions as the Health Commissioner or the Director or his authorized representative deems necessary to eliminate the ponding or erosion.

(J) The operator of each solid waste disposal facility in existence on or before July 1, 1968, which *was* subject to 3745-26 shall, not later than January 1, 1977, submit to the Director, with a copy to the Health Commissioner, an operational report for the facility. This operational report shall include a notarized statement that, to the best of the operator's knowledge, the information set forth in the operating report is true and correct. This operating report shall include the following information:

(1) a map or aerial photograph on which is indicated:

(a) all the property owned and/or leased for the facility, which map or aerial photograph shall also include all areas within 1000 feet of such facility; and

(b) all areas where waste materials have been, are being, or will be deposited; and

(c) all areas used for related operations, such as excavating or stockpiling of cover material; and

(d) the area and depth of all active and proposed excavations; and

(e) the proposed final topography of the facility. The scale on the map or aerial photograph shall not be less than 1" = 200'.

(2) a narrative description of:

(a) if any area is being excavated prior to deposit of waste materials, the specific criteria which will determine the maximum depth of excavation (for example, "This area will be excavated to the upper surface of the Bedford shale."); and

(b) current methods of operation, including:

(i) methods of receiving and unloading loaded vehicles; and

(ii) orientation and location of daily cells; and

(iii) procedures and techniques for compacting and covering waste materials; and

(iv) methods, if any, used for control of odors, noise, litter and leachate; and

(v) weights and types of equipment used to operate the site or facility; and

(vi) types of wastes received, and approximate weekly quantity of each type; and

(c) a description of how the facility will be closed.

(K) (1) the operator of each solid waste disposal facility which was *not* subject to Chapter 3745-26 of the Regulations of the Ohio EPA shall submit the report as described in paragraph (J) above, and may submit applications for waivers under Regulation 3725-27-11, in accordance with the following schedule:

County	*Deadline for Operational Report Submission*
Cuyahoga Lucas Franklin	January 1, 1978
Butler Columbian Hamilton Lake Lorain Mahoning	April 1, 1978
Montgomery Stark Summit Trumbull	July 1, 1978
Allen Ashtabula Clark Crawford Erie Fairfield Fulton	October 1, 1978

County	*Deadline for Operational Report Submission*
Geauga	
Hancock	
Licking	January 1, 1979
Marion	
Medina	
Miami	April 1, 1979
Muskingum	
Portage	
Richland	
Sandusky	
Tuscarawas	
Wayne	
Wood	
All Other Counties	July 1, 1979

(2) For facilities subject to paragraph (1) above which were established on or after July 1, 1968, the Director may require the operator to submit detail plans, specifications, and information in accordance with Regulation 3745-27-6 in addition to the operational report. The Director shall impose this requirement, if, on the basis of such factors as the location, geology, or hydrology of the site; the characteristics of the waste materials received; or the operation of the facility, he determines that there exists a substantial threat of water pollution or a potential health hazard. The operator shall submit such detail plans, specifications, and information within one hundred eighty days after being notified of this requirement.

(3) If detail plans, specifications, and information are disapproved, and all remedies for such disapproval have been exhausted or waived by failure to timely pursue such remedies, the operator shall cease receipt of waste materials not later than 60 days after such disapproval becomes effective.

3745-27-10 *CLOSURE OF SANITARY LANDFILLS*

(A) Closure of a sanitary landfill shall be deemed to occur if:

(1) the operator declares the facility closed; or

(2) a solid waste disposal license held by the sanitary landfill expires, and no further license has been applied for in the manner prescribed in Chapter EP-33; and

(3) a solid waste disposal license held by the sanitary landfill has expired, a further license has been applied for and denied, and all remedies for such denial have either been exhausted, or waived by timely failure to pursue such remedies; or

(4) a solid waste disposal license held by the sanitary landfill has been suspended or revoked, and all remedies for such revocation or suspension have either been exhausted or waived by timely failure to pursue such remedies; or

(5) detail plans, specifications and information submitted as required by Regulation 3745-27-09 (K)(2) are disapproved, and all remedies for such disapproval have either been exhausted or waived by failure to timely pursue such remedies.

(B) (1) If closure will occur as described in paragraph (A)(1) or (2) above, notice of intent to close the sanitary landfill shall be provided to the Board of Health, or, if the Director has assumed the licensing function pursuant to Ohio Revised Code Section 3734.08, to the Director, not less than 60 days prior to closure.

(2) Upon receiving the notice referred to in paragraph (1) above, or upon occurrence of the events described in paragraph (A)(3) or (4) above, the Board of Health, or, if the Director has assumed the licensing function pursuant to Ohio Revised Code Section 3734.08, the Director, shall at least once a week for not less than four weeks, publish prominent notice of the closure in a newspaper of general circulation in the county in which the sanitary landfill is located. Such notice shall be similarly published in any other county which has been the source of 25 percent or more of the solid wastes disposed of at the site that has been closed. This paragraph shall not apply to disposal facilities receiving only wastes generated on the premises where the facility is located.

(C) Not later than 60 days after closure of a sanitary landfill, the operator shall complete the following actions:

(1) All waste materials deposited in the sanitary landfill shall be covered with at least two feet of well compacted cover material that meets the requirements set forth in Regulation 3745-27-09(F); and

(2) The site shall be seeded with such grasses or other vegetation as will grow to form a complete and dense cover, which seeding shall be done as many times as necessary to insure compliance with this requirement; and

(3) All land surfaces shall be graded to slopes of no less than 1 percent and no greater than 25 percent; and

(4) All land shall be graded and drainage facilities shall be provided so as to direct surface water off the site, and not allow ponding of water on the site; and

(5) Ventilation structures shall be installed and maintained as necessary to control gas migration; and

(6) The site shall be baited for rodents, and treated for other vectors if necessary; and

(7) Except for facilities receiving only wastes generated on the premises where the facility is located, signs stating in letters not less than three inches high that the facility is permanently closed shall be posted in such a manner as to be easily visible from all access roads leading onto the site, which signs shall be maintained in legible condition for not less than two years after closure of the site; and

(8) A plat of the site shall be filed with the Board of Health having jurisdiction, the County Recorder of the county in which the facility is located, and the Director, which plat shall accurately locate and describe the completed site and include information relating to the area, depth, volume, and nature of the waste materials deposited in the sanitary landfill; and

(9) Except for facilities receiving only wastes generated on the premises where the facility is located, all entrances and access roads to the facility shall be blocked by locked gates, fencing, or other sturdy obstacles to prevent unauthorized access, unless the site is to be used for other than solid waste disposal.

(D) The Health Commissioner and the Director or his authorized representative, upon proper identification, may enter any closed sanitary landfill at any reasonable time for the purpose of determining compliance with this Regulation, 3745-27-10.

(E) if, within three years after closure, settling occurs to such an extent that ponding of water occurs on those portions of the site where waste materials are deposited, the operator, owner, or lessee shall promptly re-grade the site and/or add additional cover material and re-seed as necessary to eliminate the ponding.

(F) If, within three years after closure, cracking or erosion of the cover material occurs to such an extent that water may enter the cells, the operator, owner, or lessee shall promptly re-grade the site/or add additional cover material, and re-seed as necessary to eliminate the cracking and erosion.

(G) All monitor wells required by this Chapter, 3745-27, shall be maintained by the operator, owner, or lessee in such condition that water samples may be obtained for a period of three years after closure.

(H) If, within the three year monitoring period required by paragraph (G) above, leachate is detected on the site, or is draining from the site, in such quantities that the Director or his authorized representative or the Health Commission believes that a substantial threat of water pollution exists,

(1)(a) leachate shall be contained on the site and properly treated, or

(b) leachate shall be collected and transported from the site and properly treated, and

(2) action shall be taken to control, minimize, or eliminate the conditions which contribute to the production of leachate, and

(3) monitor wells shall be maintained by the owner, operator, or lessee in such condition that water samples may be obtained.

Actions required by this paragraph shall be continued until the Director or his authorized representative or the Health Commissioner is satisfied that actual or potential pollution of ground or surface water has been effectively controlled, minimized, or eliminated.

3745-27-11 *WAIVERS*

(A) If both the Health Commissioner and the Director or his authorized representative determine that a natural disaster or other catastrophic occurrence justifies temporary noncompliance with Regulation 3745-20-05(C), they may grant an oral waiver thereof. Requests for such waivers shall be justified in writing by the applicant within fifteen days after the granting thereof. Waivers shall be confirmed in writing by the Health Commissioner and the Director as soon as practicable, and in no case more than 30 days after the waiver is granted.

(B) Any person who wishes to obtain a waiver of any provision of Regulation 3745-27-6(I), 3745-27-07, 3745-27-08, 3745-27-09, except 3745-27-09(C), or 3745-27-10 shall apply in writing to the Director. Applications for waivers shall contain such detailed information regarding the objectives, procedures, controls, and any other pertinent data regarding the proposal, as the Director may require. An incomplete application shall not be considered. Within 30 days of the date of receipt of an incomplete application, the applicant shall be notified of the nature of any deficiency and of the Director's refusal to consider the application until the deficiency is rectified and the application completed.

(C) Any solid waste disposal facility in operation on [effective date of these regulations] which *was* subject to Chapter HE-24 of the Regulations of the Ohio EPA shall comply fully with all applicable provisions of Regulations 3745,27-07, 3745-27-08, 3745-27-09 until any waiver granted by the Director becomes final, unless the site or facility is excused from full compliance by the terms and conditions of a conditional operating license.

(D) Unless the Director has assumed the solid waste disposal licensing function pursuant to Ohio Revised Code Section 3734.08, he shall, when considering any request for a waiver, consult with the Board of Health prior to issuing a proposal or final action to grant or deny the waiver.

(E) In granting any waiver, the Director shall state with precision the provision or provisions of the regulations a waiver of which is being granted, and shall also state with precision any terms or conditions imposed upon the applicant in place of compliance with the provision or provisions a waiver of which is being granted, and may also, where appropriate, specify the time period for which the waiver is being granted.

(F) the Director shall grant a waiver only if the applicant demonstrates to the Director's satisfaction that construction and/or operation of the solid waste disposal facility in the manner allowed by the waiver and any terms or conditions imposed as part of said waiver will not cause water pollution, will not create a nuisance or a health hazard, and will not result in a violation of any regulation adopted by the Director pursuant to ORC Chapter 3704.

(G) The Director shall issue a proposed or final action to grant or deny any requested waiver within 90 days of the date on which a complete application for a waiver is received, in accordance with Chapter 3745-47 of the Regulations of the Ohio EPA.

(H) For purposes of appeal of the Director's actions under ORC Chapter 3745 or Chapter 3745-47, "waiver" shall be equivalent to "variance."

(I) Operators of solid waste disposal facilities which were *not* subject to Chapter 3745-26 [repealed] of the Regulations of the Ohio EPA may submit applications for waivers under this Regulation, 3745-27-11 in accordance with the schedule set forth in Regulation 3745-27-09(k)(1).

3745-37-01 *SOLID WASTE DISPOSAL LICENSE REQUIRED*

(A) No person shall operate a solid waste disposal facility unless such person holds a valid and unexpired solid waste disposal license for such facility issued by the Board of Health of the Health District wherein the facility is located, or by the Director, if the Director has assumed the licensing function pursuant to Ohio Revised Code Section 3734.08, unless the facility is subject to Regulation 3745-37-02(D)(1), in which case such person

shall apply for the initial license for the facility in accordance therewith.

(B) A copy of the license shall be posted in a prominent location at the facility and shall be subject to inspection by any person during normal operating hours.

3745-37-02 *SOLID WASTE DISPOSAL LICENSE APPLICATION*

(A) Applications for solid waste disposal licenses required by Regulation 3745-37-01 shall be made on forms prepared by the Director and shall contain such information as the Director may require. An incomplete application shall not be considered. Within 30 days of the receipt of an incomplete application, the applicant shall be notified of the nature of the deficiency and of the Director's or the Board of Health's refusal to consider the application until the deficiency is rectified and the application completed.

(B) Applications for solid waste disposal licenses shall be signed

(1) in the case of political subdivisions, by the chief administrative officer or contractual officer of said subdivision; or

(2) in the case of corporations, by the corporate officer having direct responsibility for the facility; or

(3) in the case of organizations other than corporations by an equivalently responsible individual; or

(4) in all other cases, by the operator.

(C) The signatures shall constitute an agreement that the signers shall assume responsibility for substantial compliance with Ohio Revised Code Chapter 3734 and these Chapters, 3745-27 and 3745-33.

(D) (1) (a) Facilities subject to Regulation 3745-27-09(K) shall apply for the initial solid waste disposal license within thirty days of submitting the operational report.

(b) All subsequent solid waste disposal licenses for facilities subject to this paragraph shall be applied for in the manner set forth in paragraph (2)(b) below.

(2) Except as provided in paragraph (1) above, applications for solid waste disposal licenses shall be made

(a) prior to start-up, and

(b) during the month of September, if the facility will continue operations beyond December 31.

Any license application not filed in the manner set forth in this Regulation, 3745-37-02(D), shall not be considered.

3745-37-03 *CRITERIA FOR ISSUING SOLID WASTE DISPOSAL LICENSES*

The Board of Health or the Director, whichever is applicable, shall not issue a solid waste disposal license unless

(1) a permit to install, if required by Chapter EP-30 of the Regulations of the Ohio EPA, has been obtained by the applicant; and

(2) detail plans have been approved by the Director, if required by Ohio Revised Code Section 3734.05, or by Regulation 3745-27-06 unless plan review and approval is pending under Regulation 3745-27-09(K)(2); and

(3) in the case of a previously or currently operating site or facility, the applicant operated the facility in substantial compliance with all applicable provisions of ORC Chapter 3734 and with these Chapters, 3745-27 and 3745-37, or Chapter 3745-26 [repealed], during the period of effectiveness of the last license held for the facility; and

(4) in the case of new facilities, the facility is adequately prepared for operations, and has been inspected by the Health Commissioner and by the Director or his authorized representative; and

(5) the person identified as the operator of the facility is competent and qualified to operate the facility in substantial accordance with ORC Chap. 3734 and these Chapters, 3745-27 and 3745-37.

3745-37-04 *ACTION BY BOARD OF HEALTH OR DIRECTOR*

(A) The Board of Health or the Director shall either grant or deny a solid waste disposal license within 90 days of the date upon which a complete application is received, unless detail plans required by Regulation 3745-27-06 have not been approved and permits required by Chapter 3745-37 of the Regulations of the Ohio EPA have not been issued by the Director prior to expiration of this 90 day period, in which case a license shall be issued or denied not later than 30 days after the effective date of the Director's approval of such detail plans and issuance of such permits.

(B) All licenses applied for pursuant to Regulation 3745-37-02(D)(2)(b) shall contain an effective date of January 1. Licenses applied for pursuant to Regulation 3745-37-02 (D)(1) or (D)(2)(a) shall be effective upon the date of issuance.

3745-37-05 *EXPIRATION OF LICENSES*

All solid waste disposal licenses shall expire on December 31 of the year in which they become effective, unless the license is for a facility subject to Regulation 3745-27-09(K)(3), in which case the license shall expire on the date set forth herein.

3745-37-06 *TRANSFER OF LICENSES*

(A) A person holding a solid waste disposal license shall not transfer said license to another person unless the license holder notifies the Board of Health and the Director in writing of the identity of the transferee and of the transferee's assumption of his obligations, at least 60 days prior to the effective date of the transfer.

(B) Not later than 60 days after receiving such notice, the Board of Health or the Director may disapprove the transfer, if the Board or the Director concludes, based on the transferee's previous operations, that the transferee will not operate the facility in substantial compliance with Ohio Revised Code Chapter 3734 and these Chapters, 3745-27 and 3745-37, or that the facility cannot be brought into substantial compliance. The Board of Health or the Director shall promptly notify the transferee and the transferor of his or its decision in writing and shall state the reasons for his or its conclusions.

(C) A solid waste disposal license may not be transferred from one facility to another.

3745-37-07 *PROCEDURES FOR GRANTING, DENYING, SUSPENDING, MODIFYING,*

REVOKING, OR DISAPPROVING TRANSFER OF SOLID WASTE DISPOSAL LICENSES.

(A) In granting, denying, suspending, modifying, revoking, or disapproving transfer of solid waste disposal licenses, the Director shall act in accordance with the provisions of Ohio Revised Code Chapters 119 and 3745, and Chapter 3745-47 of the Regulations of the Ohio EPA.

(B) In granting, denying, suspending, modifying, revoking, or disapproving transfer of solid waste disposal licenses, the Board of Health shall act in accordance with ORC Sections 3734.09, 3709.20, and 3709.21, and ORC Chap. 119.

3745-37-08 *APPROVED LIST OF HEALTH DISTRICTS*

(A) The Director shall survey annually each Health District licensing solid waste disposal facilities, as provided by Ohio Revised Code Section 3734.08, to determine whether there is substantial compliance with ORC Chapter 3734 and with these Chapters, 3745-27 and 3745-37. Substantial compliance shall be deemed to exist if:

(1) Applications for solid waste disposal licenses are on file for each licensed solid waste disposal facility in the Health district, and

(2) Applications are properly completed with all required information, and

(3) All known solid waste disposal facilities operating in the Health district and required to hold licenses by this Chapter 3745-27, and ORC Sec. 3734.05 do hold valid and unexpired licenses. and

(4) No license has been issued for any new solid waste disposal facility prior to the Director's issuance of required permits and approval of required detail plans, and

(5) Certification of inspection and compliance has been made to the Director within thirty days after issuance of a solid waste disposal license, as required by ORC Sec. 3734.07, and

(6) The Board of Health inspects solid waste disposal facilities subject to these Chapters, 3745-27 and 3745-37, with sufficient frequency to insure substantial compliance therewith, and in any event inspects each such solid waste disposal facility at least quarterly, and inspects each such new solid waste disposal facility at least bi-weekly during the first three months of operation, and

(7) The Board of Health maintains a file of information relating to each licensed solid waste disposal facility, and to each sanitary landfill closed within the last five years, which file shall include applications for solid waste disposal licenses, certification records, inspection records, approved plans, litigation information (except that privileged by the attorney-client relationship), and other pertinent information, and

(8) The Board of Health undertakes appropriate actions against persons holding solid waste disposal licenses and against persons who operate solid waste disposal facilities without holding required solid waste disposal licenses, and against other persons, whenever necessary to bring about substantial compliance with ORC Chap. 3734 and these Chapters, 3745-27 and 3745-37, and

(9) The Board of Health takes immediate action to abate serious hazards to the public health resulting from violations of ORC Chap. 3734 and these Chapters, 3745-27 and 3745-37, and

(10) The Board of Health complies with Regulation 3745-37-07, and

(11) The Board of Health seeks legal assistance from appropriate state and local agencies as necessary to carry out its assigned responsibilities.

(B) If the Director determines that there is substantial compliance with ORC Chap. 3734 and with these chapters, 3745-27 and 3745-37, he shall place the Health District upon the approved list.

(C) If the Director determines that there is not substantial compliance with ORC Chap. 3734 and with these Chapters, 3745-27 and 3745-37, he shall promptly notify the Board of Health of his determination by certified mail. The Director or his authorized representative shall also consult with and advise the Board of Health regarding its ineligibility to be placed on the approved list and steps to be taken to bring the solid waste program into compliance.

(D) Between one hundred twenty and one hundred eighty days after the mailing of the notice required by paragraph (C) above, the Director shall re-survey the Health District. If he determines that there is substantial compliance, he shall place the Health District on the approved list. If he determines that there is still not substantial compliance with ORC Chapter 3734 and these Chapters 3745-27 and 3745-37, he shall promptly

(1) enter such determination into his journal, and

(2) notify the Board of Health of his determination by certified mail, and

(3) publish notice of his determination in the Ohio EPA *Weekly Review*, and

(4) publish notice of his determination in a newspaper of general circulation in the area within the jurisdiction of the board of Health.

(E) Within fifteen days after receipt of the notice specified by Regulation 3745-37-08(D)(2) above, the Board of Health shall comply with the requirements of ORC Sec. 3734.08

3745-37-09 *RETURN OF SOLID WASTE DISPOSAL LICENSING FUNCTION TO BOARDS OF HEALTH*

(A) The Director shall return the solid waste disposal licensing function to a Board of Health from which he has taken the licensing function pursuant to Ohio Revised Code Section 3734.08 and Regulation 3745-37-08 if he determines that the Board of Health is both capable of and willing to enforce all applicable requirements of ORC Chapter 3734 and these Chapters, 3745-27 and 3745-37.

(B) In making the determination required in paragraph (A) above, the Director shall take into consideration

(1)(a) changes in or additions to the staff, and

(b) increases in the funds available to the Board of Health for enforcement of ORC Chap. 3734 and these Chapters, 3745-27 and 3745-37; and

(2) written assurances from the Board of Health of increased efforts on the part of the Board, and

(3) decreases in the number of complexity of the solid waste disposal facilities that would be within the Board of Health's jurisdiction, and

(4) any other factor that indicates to the Director that the board of Health meets the criteria set forth in paragraph (A) above.

(C) If the Director makes the determination described in paragraph (A) above, he shall promptly

(1) enter such determination into his journal, and

(2) notify the Board of Health of his determination by certified mail, and

(3) publish notice of his determination in the Ohio EPA *Weekly Review*, and

(4) publish notice of his determination in a newspaper of general circulation in the area within the jurisdiction of the Board of Health

3745-37-10 *TIME FOR INSPECTIONS*

Whenever a person requests in writing that the Health Commissioner or the Director or his authorized representative make any inspection required by these Chapters, 3745-27 and 3745-37, the Health Commissioner of the Director or his authorized representative shall make such inspection within 15 calendar days of receipt of the request.

3745-11 *CONDITIONAL SOLID WASTE DISPOSAL LICENSES*

(A) Before the Board of Health or the Director may make final the suspension, denial, or revocation of any solid waste disposal license held by any political subdivision, the Board or the Director shall issue a proposed suspension, denial, or revocation in the manner set forth in Regulation 3745-37-07.

(B) If the political subdivision to which the proposed suspension, denial, or revocation is issued requests an adjudication hearing to contest the proposed denial, suspension, or revocation, the political subdivision may, at the adjudication hearing, present evidence relating to its financial ability to comply with Chapter 3745-27. such evidence shall show

(1) that the political subdivision is levying taxes that revenues from which may be expended to comply with Chapter 3745-27 at the maximum rates imposed by the Ohio Constitution and the applicable statutes, and

(2) that the political subdivision has diligently attempted to increase taxes the revenues from which may be expended to comply with Chapter 3745-27 beyond the limits normally imposed by the applicable statutes and the Ohio Constitution and has been unsuccessful, and

(3) that expending sufficient funds to comply with Chapter 3745-27 would divert revenues from police forces, courts, fire departments, or essential public health programs other than solid waste disposal, and

(4) that incurring indebtedness for purposes of compliance with Chapter 3745-27 would be imprudent in view of the overall financial condition of the political subdivision, or that, if indebtedness has already been incurred, incurring additional indebtedness would be imprudent, and

(5) that the political subdivision cannot legally levy and enforce a user fee on all users of the site or facility sufficient to permit compliance with Regulation 3745-27, and

(6) that the political subdivision cannot feasibly utilize the licensed disposal facility of another political subdivision, or operate a disposal facility jointly with another political subdivision, and

(7) that the political subdivision has fully assessed the capabilities and capacities of private solid waste management firms to supply those facilities and/or services for which the application for a conditional solid waste disposal license is being made. The Board or the Director shall require evidence that the political subdivision has directly contacted private firms and has been unable to secure those services or facilities for which the conditional license is being requested.

(C) If the political subdivision proves to the satisfaction of the Board or the Director that all of the criteria set forth in paragraph (B) above are satisfied, the Board or the Director may, if the hearing was from denial of a license, grant a conditional operating license, which shall excuse the political subdivision from compliance with such provisions of Chapter 3745-27 as were shown at the hearing to be beyond the political subdivision's financial ability; or may, if the hearing was from suspension or revocation of a license, modify the license so as to excuse the political subdivision from compliance with such provisions of Chapter 3745-27 as were shown at the hearing to be beyond its financial ability. Such licenses shall be in all other respects identical to other solid waste disposal licenses issued under this Chapter, 3745-37.

(D) Whenever the Board or the Director grants a conditional solid waste disposal license as provided in paragraph (D) above, it shall specify in the license a reasonable time within which the political subdivision shall be required to bring the solid waste disposal facility for which the license was issued into full compliance with Chapter 3745-27.

(E) Whenever a political subdivision holding a conditional operating license, or a solid waste disposal license modified pursuant to paragraph (D) above, is required by Regulation 3745-37-02(D) to apply for another license because of the impending expiration of the currently effective license, such political subdivision shall make application in the same manner as applications are made for other solid waste disposal licenses. The Board of Health or the Director shall process such application in the same manner as other applications are required to be processed by this Chapter, 3745-37. If, upon receiving notice of the Board's or the Director's proposed denial of the application, the political subdivision determines that it wishes to obtain another conditional operating license, it shall proceed as provided in paragraphs (B) through (E) above.

(F) No solid waste disposal facility operating under a conditional license shall be permitted to receive sewage solids, semi-solids and liquids, other semi-solids or liquids, or hazardous wastes.

OHIO SOLID AND HAZARDOUS WASTE DISPOSAL LAW

(Ohio Revised Code, Title 37, Health, Safety and Morals, Chapter 34 — Solid and Hazardous Wastes Laws of 1972, S 397 (Eff. 10-23-72); Laws of 1978, S 266 (Eff. 3-19-79); Laws of 1980, S 269 (Eff. 10-9-80); Laws of 1981, S 134 (Eff. 5-23-81), H 694 (Eff. 11-15-81); Laws of 1982, S 530 (Eff. 6-25-82), S 550 (Eff. 11-26-82); Laws of 1983, H 291 (Eff. 7-1-83))

Administering Agency: Ohio Environmental Protection Agency
Box 1049
361 E. Broad Street
Columbus, Ohio 43216

3734.01

As used in Chapter 3734 of the Revised Code:

(A) "Board of health" means the board of health of a city or general health district, or the authority having the duties of a board of health in any city as authorized by section 3709.05 of the Revised Code.

(B) "Director" means the director of environmental protection.

(C) "Health district" means a city or general health district as created by or under authority of Chapter 3709 of the Revised Code.

(D) "Agency" means the environmental protection agency.

(E) "Solid wastes" means such unwanted residual solid or semisolid material as results from industrial, commercial, agricultural, and community operations, excluding earth or material from construction, mining, or demolition operations, or other waste materials of the type that would normally be included in demolition debris, nontoxic fly ash, spent nontoxic foundry sand, and slag and other substances that are not harmful or inimical to public health, and includes, but is not limited to, garbage, combustible and noncombustible material, street dirt, and debris.

(F) "Disposal" means the discharge, deposit, injection, dumping, spilling, leaking, emitting, or placing of any solid wastes or hazardous waste into or on any land or ground or surface waters or into the air, except if the disposition or placement constitutes storage or treatment.

(G) "Person" includes the state, any political subdivision and any other state or local body, the United States and any agency or instrumentality there of, and any legal entity defined as a person under Section 1.59 of the Revised Code.

(H) "Open burning" means the burning of solid wastes in an open area of burning of solid wastes in a type of chamber or vessel that is not approved in regulations adopted by the director under Section 3734.02 of the Revised Code.

(I) "Open dumping" means the depositing of solid wastes into a body or stream of water or onto the surface of the ground without compacting the wastes and covering with suitable material to a depth as prescribed by regulations adopted by the director under Section 3734.02 of the Revised Code.

(J) "Hazardous waste" means any waste or combination of wastes in solid, liquid, semisolid, or contained gaseous form that in the determination of the director, because of its quantity, concentration, or physical, chemical, or infectious characteristics may:

(1) Cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness;

(2) Pose a substantial present or potential hazard to human health or safety or to the environment when improperly stored, treated, transported, or disposed of, or otherwise managed.

Hazardous waste includes any substance identified by regulation as hazardous waste under the "Resource

Conservation and Recovery Act of 1976," 90 Stat. 2806, 42 U.S.C. 6921 to 6931, as amended, and does not include any substance that is subject to the "Atomic Energy Act of 1954," 68 Stat. 919, 23 U.S.C. 2011.

(K) "Treat" or "treatment," when used in connection with hazardous waste, means any method, technique, or process designed to change the physical, chemical, or biological characteristics or composition of any hazardous waste to neutralize it or render it nonhazardous, safer for transport, or amenable for recovery, storage, or disposal, or to reduce its volume.

(L) "Manifest" means the form used for identifying the quantity, composition, origin, routing, and destination of hazardous waste during its transportation from the point of generation to the point of disposal, treatment, or storage.

(M) "Storage," when used in connection with hazardous waste, means the containment of hazardous waste, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazard ous waste.

(N) "Facility" means any site, location, tract of land, installation, or building, used for incineration, composting, sanitary landfilling, or other methods of disposal of solid wastes, or for the storage, treatment, or disposal of hazardous waste.

(O) "Closure" means the time at which a hazardous waste facility will no longer accept hazardous waste for treatment, storage, or disposal or the effective date of an order revoking the permit for a hazardous waste facility. The term includes measures performed to restore the physical condition of the facility to protect public health or safety, to prevent air or water pollution, or to make the facility suitable for other uses, if any, including, but not limited to, establishment and maintenance of a suitable cover of soil and vegetation over cells in which hazardous waste is buried; minimization of erosion, the infiltration of surface water into such cells, the production of leachate, and the accumulation and runoff of contaminated surface water; the final construction of facilities for the collection and treatment of leachate and contaminated surface water runoff; the final construction of air and water quality monitoring facilities; or the removal and proper disposal of hazardous waste from a facility when necessary to protect public health or safety or to abate or prevent air or water pollution.

(P) "Premises" means:

(1) Geographically contiguous property owned by a generator; or

(2) Noncontiguous property that is owned by a generator and connected by a right-of-way that he controls and to which the public does not have access. Two or more pieces of property that are geographically contiguous and divided by public or private right-of-way or rights-of-way are a single premises.

3734.02

(A) The director of environmental protection, in accordance with Chapter 119 of the Revised Code, shall adopt and may modify, suspend, or appeal regulations having uniform application throughout the state governing solid waste disposal sites and facilities and the inspections and issuance of licenses for all solid waste facilities, in order to assure that the facilities will be located, maintained, and operated in a sanitary manner so as not to create a nuisance, cause or contribute to water pollution, or create a health hazard. The regulations shall not concern or relate to personnel policies, salaries, wages, fringe benefits, or other conditions of employment of employees of persons owning or operating solid waste disposal sites and facilities. No person shall violate any such regulation.

(B) The director shall prescribe and furnish the forms necessary to administer and enforce Chapter 3734 of the Revised Code. The director may cooperate with and enter into agreements with other state, local, or federal agencies to carry out the purposes of Chapter 3734 of the Revised Code. The director may exercise all incidental powers necessary to carry out the purposes of Chapter 3734 of the Revised Code.

(C) No person shall establish a solid waste facility without submitting application for a permit with accompanying detail plans, specifications, and information regarding the facility and method of operation, and receiving a permit issued by the director.

(D) Chapter 3734 of the Revised Code and regulations adopted pursuant thereto are not applicable to single family residential premises or to the temporary storage of solid wastes other than hazardous wastes prior to their collection for disposal or to the collection of solid wastes other than hazardous wastes by a political subdivision or a person holding a franchise or license from a political subdivision of the state.

(E) No person shall establish or operate a hazardous waste facility, or use a solid waste facility for the storage, treatment, or disposal of any hazardous waste, without a hazardous waste facility installation and operation permit from the director. The permit shall be issued subject to approval by the Hazardous Waste Facility Approval Board in accordance with Section 3734.05 of the Revised Code and to payment of an annual fee not to exceed one thousand dollars, payable upon application and upon the anniversaries of the date of issuance during the term of the permit, to be credited to the hazardous waste management special account created in section 3734.18 of the Revised Code.

(F) No person shall store, treat, or dispose of hazardous waste anywhere, regardless whether generated on or off the premises where the waste is stored, treated, or disposed of, or transport or cause to be transported any hazardous waste to any other premises, except at or to:

(1) A hazardous waste facility operating under a permit issued under this chapter;

(2) A facility in another state operating under a license or permit issued in accordance with the "Resource Conservation and Recovery Act," 90 Stat. 2806, 42 U.S.C. 6921;

(3) A federally approved facility for the disposal of polychlorinated biphenyls in compliance with the "Toxic Substances Control Act," 90 Stat. 2003, 15 U.S.C.A. 2601;

(4) A facility in another nation in accordance with the laws of that nation.

(5) A facility holding a permit issued pursuant to Title I of the "Marine Protection, Research, and Sanctuaries Act," 86 Stat. 1052, 33 U.S.C.A. 1401; or

(6) The particular manufacturing plant where the waste is to be used as a raw material or other component in a production process.

(G) The director may be order exempt any person generating, storing, treating, disposing of or transporting solid wastes or hazardous waste in such quantities or under such circumstances that in the determination of the director, it is unlikely that the public health or safety or the environment will be adversely affected thereby, from any requirement to obtain a permit or license, or comply with the manifest system, or other requirements of this chapter. Any such exemption shall be consistent with and substantially equivalent to the regulations promulgated by the Administrator of the United States Environmental Protection Agency under the "Resource Conservation and Recovery Act of 1976." 90 Stat. 2806, 42 U.S.C. 6921, as amended.

(H) No person shall engage in filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility was operated or where a solid waste facility was operated and the director determines that significant amounts of hazardous waste were disposed of without prior authorization from the director, who shall establish the procedure for granting such authorization by rules adopted in accordance with chapter 119. of the Revised Code.

(I) No owner or operator of a hazardous waste facility shall, in the operation of the facility, cause, permit, or allow the emission therefrom of any odor that, in the opinion of the director of environmental protection, unreasonably interferes with the comfortable enjoyment of life or property by persons living or working in the vicinity of the facility, or that is injurious to public health. Any such action is hereby declared to be a public nuisance.

3734.03

No person shall dispose of solid wastes by open burning or open dumping except as authorized by the director of environmental protection in regulations adopted in accordance with section 3734.02 of the Revised Code.

3734.04

The board of health of each district shall provide for the inspection, licensing, and enforcement of sanitary standards for solid waste disposal facilities and sites in conformity with Chapter 3734 of the Revised Code. The director of environmental protection shall provide for the inspection of hazardous waste facilities and of generators and transporters of hazardous waste, issuance of permits and enforcement of chapter 3734. of the Revised Code and of rules adopted thereunder governing storage, treatment, transportation, and disposal of hazardous waste.

3734.05

(A) No person shall operate or maintain a solid waste facility without a license issued by the board of health of the health district in which the facility is located.

During the month of December, but before the first of January of the next year, every person proposing to continue to operate an existing solid waste facility shall procure a license to operate the facility for that year from the board of health of the health district in which the facility is located. A person who has received a license, upon sale or disposition of a solid waste facility may, upon consent of the board of health and the director of environmental protection have the license transferred to another person.

Each person proposing to open a new solid waste facility shall submit an application for a permit with accompanying detail plans and specifications to the environmental protection agency for required approval under the regulations adopted by the director of environmental protection pursuant to section 3734.02 of the Revised Code at least ninety days before proposed operation of the site or facility and concurrently make application for a license with the board of health of the health district in which the proposed facility is to be located.

(B) Each person who proposes to establish or operate a hazardous waste storage, treatment, or disposal facility shall submit an application for a hazardous waste facility installation and operation permit and accompanying detail plans, specifications and information to the Environmental Protection Agency at least one hundred eighty days before the proposed beginning of operation of the facility.

(C)(1) There is hereby created the hazardous waste facility approval board, composed of the director of environmental protection who shall serve as chairperson, the director of natural resources, the chairman of the Ohio water development authority, and one chemical engineer and one geologist who shall each be employed by a State University as defined in section 3345.011 of the revised code. The chemical engineer and geologist shall each be appointed by the governor, with the advice and consent of the senate, for a term of two years. The chemical engineer and geologist shall each receive as compensation five thousand dollars per year, plus expenses necessarily incurred in the performance of their duties. The board shall not issue any final order without the consent of at least three members.

(2) The hazardous waste facility approval board shall:

(a) Pursuant to Chapter 119 of the Revised Code,

adopt rules governing procedure to be followed in hearings before the board; and

(b) Approve or disapprove applications for a hazardous waste facility installation and operation permit.

(3) Upon receipt of the completed application for a hazardous waste facility installation and operation permit and a preliminary determination by the staff of the environmental protection agency that the application appears to comply with agency rules and to meet the performance standards set forth in division (D) of Section 3734.12 of the Revised Code, the director of environmental protection shall transmit the application to the hazardous waste facility approval board, which shall:

(a) Promptly fix a date for public hearing thereon, not fewer than sixty nor more than ninety days after receipt of the completed application. At the public hearing, any person may submit written or oral comments or objections to the approval or disapproval of the application.

(b) Give public notice of the date of public hearing and a summary of the application in a newspaper having general circulation in the county in which the facility is proposed to be located. The notice shall contain, at a minimum, the date, time and location of the public hearing, and shall include a map indicating the location of the proposed facility, a description of the proposed facility, and the location where copies of the application are available for inspection; and

(c) Promptly fix a date for an adjudication hearing, not less than ninety nor more than one hundred twenty days after receipt of the completed application, at which hearing the board shall hear and decide all disputed issues between the parties respecting the approval or disapproval of the application.

(4) The parties to any adjudication hearing before the board upon a completed application shall be:

(a) The applicant;

(b) The staff of the environmental protection agency;

(c) The board of county commissioners of the county and the chief executive officer of the municipal corporation in which the facility is proposed to be located; and

(d) Any other person who would be aggrieved or adversely affected by the proposed facility and who files a petition to intervene in the adjudication hearing not later than thirty days after the date of publication of the notice required in division (C)(3)(b) of this section, if the petition is granted by the board for good cause shown.

(5) The hazardous waste facility approval board shall conduct any adjudication hearing upon disputed issues in accordance with chapter 119, of the Revised Code and the rules of the board governing the procedure of such hearings. Each party may call and examine witnesses and submit other evidence respecting the disputed issues presented by an application. A written record shall be made of the hearing and of all testimony and evidence submitted to the board.

(6) The board shall not approve an application for a hazardous waste facility installation and operation permit unless it finds and determines:

(a) The nature and volume of the waste to be treated, stored, or disposed of at the facility;

(b) That the facility complies with the director's hazardous waste standards adopted pursuant to section 3734.12 of the revised code;

(c) That the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of various alternatives, and other pertinent considerations;

(d) That the facility represents the minimum risk of:

(i) Contamination of ground and surface waters by leachate and runoff from the facility;

(ii) Fires or explosions from improper treatment, storage, or disposal methods; or

(iii) Accident during transportation of hazardous waste to the facility; and

(e) That the facility will comply with chapters 3704., 3734., and 6111. of the Revised Code and all rules and standards adopted under these sections.

In rendering a decision upon an application for a hazardous waste facility installation and operation permit, the board shall issue a written order and opinion, which shall include the specific findings of fact and conclusions of law which support the board's approval or disapproval of the application.

If the board approves an application for a hazardous waste facility installation and operation permit, it shall, as a part of its written order, issue the permit, upon such terms and conditions as the board finds are necessary to ensure the construction and operation of the hazardous waste facility in accordance with the standards of this section.

(7) Any party adversely affected by an order of the hazardous waste facility approval board may appeal the order and decision of the board to the court of appeals of Franklin county. An appellant shall file with the board a notice of appeal, which shall designate the order appealed from. A copy of the notice shall also be filed by the appellant with the court, and a copy shall be sent by certified mail to each party to the adjudication hearing before the board. Such notices shall be filed and mailed within thirty days after the date upon which appellant received notice from the board by certified mail of the making of the order appealed from. No appeal bond shall be required to make an appeal effective.

The filing of a notice of appeal shall not automatically operate as a suspension of the order of the board. If it appears to the court that an unjust hardship to the appellant will result from the execution of the board's order pending determination of the appeal, the court may grant a suspension of the order and fix its terms.

Within twenty days after receipt of the notice of appeal, the board shall prepare and file in the court the complete record of proceedings out of which the appeal arises, including any transcript of the testimony and any other evidence that has been submitted before the board. The expense of preparing and transcribing the record shall be taxed as a part of the costs of the appeal. The

appellant, other than the state or a political subdivision, an agency of either, or any officer of the appellant acting in his representative capacity, shall provide security for costs satisfactory to the court. Upon demand by a party the board shall furnish at the cost of the party requesting the same a copy of the record. If the complete record is not filed within the time provided for in this section, any party may apply to the court to have the case docketed, and the court shall order the record filed.

In hearing the appeal, the court is confined to the record as certified to it by the board. The court may grant a request for the admission of additional evidence when satisfied that the additional evidence is newly discovered and could not with reasonable diligence have been ascertained prior to the hearing before the board.

The court shall affirm the order complained of in the appeal if it finds, upon consideration of the entire record and such additional evidence as the court has admitted, that the order is supported by reliable, probative, and substantial evidence and is in accordance with law. In the absence of such findings, it shall reverse, vacate, or modify the order or make such other ruling as is supported by reliable, probative, and substantial evidence and is in accordance with law. The judgment of the court shall be final and conclusive unless reversed, vacated, or modified on appeal. Such appeals may be taken by any party to the appeal and shall proceed as provided in chapter 2505 of the Revised Code.

(D)(1) Upon receipt of a completed application, the board shall issue a hazardous waste facility installation and operation permit for a hazardous waste facility subject to the requirements of division (C)(6) and (7) of this section and all applicable federal regulations if the facility for which the permit is requested:

(a) Was in operation immediately prior to the effective date of this division;

(b) Was in substantial compliance with applicable statutes and rules in effect immediately prior to the effective date of this division as determined by the director;

(c) Demonstrates to the board that its operations after the effective date of this division will comply with applicable performance standards adopted by the director pursuant to division (D) of Section 3734.12 of the Revised Code; and

(d) Submits a completed application for a permit under division (B) of this section within six months after the effective date of this division.

The board shall act on the application within twelve months after the effective date of this division.

(2) A hazardous waste facility that was in operation immediately prior to the effective date of this division may continue to operate after the effective date of this division if it:

(a) Complies with performance standards adopted by the director pursuant to division (D) of Section 3734.12 of the Revised Code;

(b) Submits a completed application for a hazardous waste installation and operation permit under division (B) of this section within six months after the effective date of this division; and

(c) Obtains the permit under division (C) of this section within twelve months after the effective date of this division.

(3) No political subdivision of this state shall require any additional zoning or other approval, consent, permit, certificate, or other condition for the construction or operation of a hazardous waste facility authorized by a hazardous waste facility installation and operation permit issued pursuant to this chapter, nor shall any political subdivision adopt or enforce any law, ordinance, or regulation that in any way alters, impairs, or limits the authority granted in the permit issued by the board.

(4) After the issuance of a hazardous waste facility installation and operation permit by the board, each hazardous waste disposal facility shall be subject to the rules and supervision of the director of environmental protection during the period of its operation and closure.

(E) Upon approval of the board in accordance with divisions (C) and (D) of this section, the board may issue a single hazardous waste facility installation and operation permit to a person who operated two or more adjoining facilities where hazardous waste is generated, stored, treated or disposed of, if the application includes detailed plans, specifications, and information on all facilities. For purposes of this section, "adjoining" means sharing a common boundary, separated only by a public road, or in such proximity that the director determines that the issuance of a single permit will not create a hazard to the public health or safety or the environment.

(F) No person shall fail to keep or submit or knowingly falsify any plans, specifications data, reports, records, manifests, or other information required to be kept or submitted to the director by Chapter 3734 of the Revised Code or the rules adopted thereunder.

3734.06

(A) The annual fee for a solid waste facility operator's license shall be as follows:

(1) If the facility is open for more than twenty hours per week to receive solid wastes for disposal, the fee shall be not less than four hundred nor more than one thousand three hundred dollars, as determined by the board of health of the health district in which the facility is located.

(2) If the facility is open for twenty hours or less per week to receive solid wastes for disposal, the fee shall be an amount equal to two hundred dollars plus twenty-five per cent of the amount of the fee established by the board of health under division (A)(1) of this section that exceeds four hundred dollars.

(3) The same fees shall apply to private operators [*sic*] and to the state and its political subdivisions and shall be paid at the time application is made for a license. The fee includes the cost of licensing, all inspections, and other costs associated with the administration of the solid waste program under this chapter.

(B) The board of health shall transmit four hundred dollars of each such license fee collected under division (A)(1) of this section and two hundred dollars of each

such license fee collected under division (A)(2) of this section to the director of environmental protection within forty-five days after receipt of such fee. The director shall transmit these moneys to the treasurer of state to be credited to the solid waste facility special account, which is hereby created in the state special revenue fund. The director of environmental protection shall administer the special account. Moneys paid into the special account shall be used solely to administer and enforce Chapter 3734. of the Revised Code and rules adopted thereunder.

(C) Any license fees collected under division (A)(1) of this section in excess of four hundred dollars and any license fees collected under division (A)(2) of this section in excess of two hundred dollars shall be retained by the board and paid into a special fund, hereby created in each health district, and used only by the board to administer and enforce Chapter 3734. of the Revised Code and the rules adopted thereunder.

3734.07

(A) Before a license is initially issued and annually thereafter, or more often if necessary, the board of health shall cause each solid waste facility to be inspected and a record to be made of each such inspection, and require each solid waste facility in the health district to satisfactorily comply with Chapter 3734 of the Revised Code.

(B) Within thirty days after the issuance of a license, the board of health shall certify to the director of Environmental Protection that the solid waste facility or site has been inspected and is in satisfactory compliance with Chapter 3734 of the Revised Code. Each board of health shall provide the director with such other information as he may require from time to time.

(C) The board of health or its authorized representative and the director or his authorized representative, upon proper identification and upon stating the purpose and necessity of an inspection, may enter at reasonable times upon any private or public property, real or personal, to inspect or investigate, obtain samples, and examine and copy records to determine compliance with this chapter. If entry is refused or inspection or investigation is refused, hindered, or thwarted, the director may revoke or suspend a facility's operating license or permit, and the board of health or its authorized representative or the director or his authorized representative may apply for, and any judge of a court of record may issue, an appropriate inspection warrant necessary to achieve the purposes of this chapter within the court's territorial jurisdiction.

3734.08

(A) The director of Environmental Protection shall survey annually each health district licensing solid waste disposal sites and facilities as provided by section 3734.05 of the Revised Code to determine whether there is substantial compliance with Chapter 3734 of the Revised Code, and upon determining that there is substantial compliance, shall place such health district upon an approved list. The director shall make a resurvey when in his opinion such is necessary, and shall remove from the approved list any health district not substantially complying with Chapter 3734 of the Revised Code.

(B) If, after a survey or resurvey is made as provided by this section, the director determines that a health district is not eligible to be placed on the approved list or to continue on the list, he shall certify that fact to the board of health of the health district and the director shall administer and enforce Chapter 3734 of the Revised Code, in such health district until such time as the health district is placed on the approved list. Whenever the director is so required to administer and enforce Chapter 3734 of the Revised Code, in any health district, he is hereby vested with all the authority and all the duties granted to or imposed upon a board of health by Chapter 3734 of the Revised Code, in the health district. All fees required to be paid to a board of health by section 3734.06 of the Revised Code and all previous fees paid to be board that have not been expended or encumbered shall be paid to the director and by him deposited in the state treasury to the credit of a special fund to be used by him for the purpose of administering and enforcing the solid waste provisions of Chapter 3734 of the Revised Code.

3734.09

The board of health of a health district in which a solid waste facility is located may suspend, revoke, or deny a license for the facility for violation of any section of this chapter. The director of environmental protection may suspend, revoke, or deny a permit to operate any hazardous waste storage, treatment or disposal facility, for violation of any section of this chapter or any regulation adopted thereunder. No application for a permit or license to be issued under this chapter shall be denied, and no permit or license issued under this chapter shall be modified, suspended, or revoked, without a written order stating the findings upon which the denial, suspension, modification, or revocation are based. A copy of the order shall be sent to the applicant or permit or license holder by certified mail. Unless an emergency exists requiring immediate action to protect the public health or safety or the environment, no suspension, modification, or revocation of a license or permit shall be made effective until the permit or license holder has been given notice in writing and a reasonable period of time to make corrections.

Before the board of health may suspend, revoke, or deny a license to a political subdivision, it shall afford the political subdivision a hearing at which time the political subdivision may present evidence concerning its financial ability to comply with the regulations adopted by the director pursuant to Section 3734.02 of the Revised Code. The evidence may include and the board of health shall consider the existing limitations on the taxing power and debt limitations of the political subdivision, the extent to which the political subdivision is levying taxes and has in-

curred debt, and the other governmental and proprietary needs of the political subdivision as such needs affect its remaining authority to levy taxes and incur debt to comply with the regulations adopted by the director. After considering the evidence the board of health may grant the political subdivision a conditional license to operate a solid waste facility, without full compliance with the regulations adopted by the director and establish a reasonable time for full compliance by the political subdivision, which time may be extended by the board of health from time to time for good cause. Appeal from any suspension, revocation, or denial of a license shall be made in accordance with sections 3745.02 to 3745.06 of the Revised Code.

3734.10

The attorney general, or the prosecuting attorney of the county or the city solicitor or attorney of the city where a violation occurs, upon complaint of the respective board of health of the health district, the legislative authority of a political subdivision in which a violation occurs, or the director of environmental protection, shall prosecute to termination or bring an action for injunction against any person violating any section of this chapter. The court of common pleas in which an action for injunction is filed has the jurisdiction to grant injunctive relief upon a showing that the respondent named in the petition is operating a solid waste facility or a hazardous waste facility in violation of any section of this chapter or regulations adopted thereunder. The court shall give precedence to such an action over all other cases.

Upon written complaint by any person the board of health or the director of environmental protection shall conduct such investigations and made such inquiries as are necessary to secure compliance with this chapter or the regulations adopted thereunder. The director or any board of health may, upon complaint or upon their own initiative, investigate or make inquiries into any alleged violation or act of improper solid waste disposal or improper hazardous waste storage, transportation, treatment or disposal.

Chapter 3734. of the Revised Code does not abridge rights of action or remedies in equity or under common law or prevent the state or any municipal corporation or person in the exercise of their rights in equity or under common law to suppress nuisances or to abate pollution.

3734.11

No person shall violate any section of this chapter.

3734.12

The director of environmental protection shall adopt, and may modify, suspend, or repeal rules in accordance with Chapter 119 of the Revised Code, which shall be consistent with and substantially equivalent to the regulations promulgated under the "Resource Conservation and Recovery Act of 1976," 90 Stat. 2806, 42 U.S.C. 6921, as amended.

(A) Adopting the criteria and procedures established under the "Resource Conservation and Recovery Act of 1976." 90 Stat. 2806, 42 U.S.C. 6921 for identifying hazardous waste. The director shall prepare, revise when appropriate, and publish a list of substances or categories of substances identified to be hazardous, which shall be the same as the list of substances identified as hazardous pursuant to Section 3001 (B) of such act.

(B) Estabishing standards for generators of hazardous waste necessary to protect human health and safety and the environment, in accordance with this chapter including but not limited to, requirements respecting:

(1) Record-keeping practices that accurately identify the quantities of hazardous waste generated, the constituents thereof that are significant in quantity or in potential harm to human health or safety or the environment, and the disposition of the waste;

(2) Labeling of containers used for storage, transportation, or disposal of hazardous waste to identify such wastes accurately;

(3) Use of appropriate containers for hazardous waste;

(4) Providing information on the general chemical composition of hazardous waste to persons transporting, treating, storing or disposing of the waste;

(5) A manifest system requiring a manifest form consistent with that prescribed under the "Resource Conservation and Recovery Act," 90 Stat. 2795, 42 U.S.C.A. 6901, as amended, requiring a manifest for any hazardous waste transported off the premises where generated and assuring that all hazardous waste that is transported off the premises where generated is designated for treatment, storage, or disposal in facilities for which a permit has been issued or in the other facilities specified in division (F) of Section 3734.02 of the Revised Code;

(6) Submission of such reports to the director as the director deems necessary.

(C) Establishing standards for transporters of hazardous waste necessary to protect human health or safety or the environment, including, but not limited to, requirements respecting:

(1) Record-keeping concerning hazardous waste transported, including source and delivery points, and submission of reports as necessary;

(2) Submission of such reports to the director as the director determines necessary;

(3) Transportation of only properly labeled waste;

(4) Compliance with the manifest system required by division (B) of this section;

(5) Transportation of hazardous waste only to the treatment, storage, or disposal facility which the shipper designates on the manifest form to be a facility holding a permit or another facility specified in division (F) of Section 3734.02 of the Revised Code;

(6) Contingency plans to minimize unanticipated damage from transportation of hazardous wastes.

(7) Registration of any transporter of hazardous waste with the agency designated by rule under this chapter, in-

cluding the issuance of registration certificates by that agency.

In the case of any hazardous waste that is subject to the "Hazardous Materials Transportation Act," 88 Stat. 2156, 49 U.S.C. 1801, the regulations shall be consistent with that act and regulations thereunder.

(D) Establishing performance standards for owners and operators of treatment, storage, and disposal facilities necessary to protect human health or safety and the environment, including, but not limited to, requirements respecting:

(1) Maintaining records of all hazardous waste that is treated, stored, or disposed of, and of the manner in which the waste was treated, stored, or disposed of, and submission of such reports as may be necessary;

(2) Submission of such reports to the director as the director determines necessary;

(3) Reporting, monitoring, inspection, and compliance with the manifest system referred to in division (B) of this section;

(4) Treatment, storage, or disposal of all waste received by methods, techniques, and practices approved by the director;

(5) Location, design, and construction of treatment, storage, or disposal facilities;

(6) Contingency plans for effective action to minimize unanticipated damage from treatment, storage, or disposal of hazardous waste;

(7) Requirements concerning ownership, continuity of operation, training for personnel, and financial responsibility, including the filing of a closure and long-term care surety bond or equivalent in cash or certificates of deposit. No private entity shall be precluded by reason of these requirements from the ownership or operation of facilities providing hazardous waste treatment, storage, or disposal services if the entity can provide assurances of financial responsibility and continuity of operation consistent with the degree and duration of risks associated with the treatment, storage, or disposal of specified hazardous waste.

(E) Governing the issuance, modification, revocation, suspension, withdrawal, and denial of installation and operation permits, draft permits, and transportation certificates of registration:

(F) Specifying information required to be included in applications for installation and operation permits including but not limited to, detail plans, specifications, and information respecting.

(1) The composition, quantities, and concentrations of hazardous waste and solid wastes to be stored, treated, transported, or disposed of, and such other information as the director may require regarding the method of operation;

(2) The facility to which the waste will be transported, or where it will be stored, treated, or disposed of.

(3) The closure and long-term care of a hazardous waste facility where hazardous waste will no longer be treated, stored, or disposed of.

(G) Establishing procedures that will ensure that all information entitled to protection as trade secrets disclosed to the director or his authorized representative is not disclosed without the consent of the owner, except that such information may be disclosed, upon request, to authorized representatives of the United States Environmental Protection Agency, or as required by law. As used in this section, "trade secrets" means any formula, plan, pattern, process, tool, mechanism, compound, procedure, production date, or compilation of information that is not patented, that is known only to certain individuals within a commercial concern who are using it to fabricate, produce, or compound an article, trade, or service having commercial value, and that gives its user an opportunity to obtain a business advantage over competitors who do not know or use it.

(H) Governing the issuance, modification, revocation, suspension, or denial of variances from his rules. The director may order the person to whom a variance is issued to take such action within such time as the director may determine to be appropriate and reasonable to prevent the creation of a nuisance or a hazard to the public health or safety or the environment. Applications for variances shall contain such detail plans, specifications, and information regarding objectives, procedures, controls, and other pertinent data as the director may require. The director shall grant a variance only if the applicant demonstrates to the director's satisfaction that construction and operation of the solid waste facility, or hazardous waste facility, or transportation of hazardous waste in the manner allowed by the variance and any terms or conditions imposed as part of the variance will not create a nuisance or a hazard to the public health or safety or the environment. In granting any variance, the director shall state the specific provision or provisions whose terms are to be varied, and shall also state specific terms or conditions imposed upon the applicant in place of the provision or provisions. The director may hold a public hearing on an application for a variance or renewal thereof at a location in the county where the operations that are the subject of the application for the variance are conducted. The director shall give not less than twenty days notice of the hearing to the applicant by certified mail and shall cause at least one publication of notice in a newspaper with general circulation in the county where the hearing is to be held. The director shall make available for public inspection at the principal office of the Environmental Protection Agency a current list of pending applications for variances and a current schedule of pending variance hearings. The director shall make a complete stenographic record of testimony and other evidence submitted at the hearing. Within ten days after the hearing the director shall make a written determination to issue, renew, or deny the variance, and shall enter his determination and the basis therefor into the record of the hearing. The director shall issue, renew, or deny an application for a variance or renewal thereof within six months of the date upon which the director receives a complete application with all pertinent information and data required. No variance shall be issued, revoked, modified, or denied until the director has considered the relative interests of the applicant, other persons and property affected by the variance, and the general public. Any

variance granted pursuant to this section shall be for a period specified by the director and may be renewed from time to time on such terms and for such periods as the director determines to be appropriate. No application shall be denied and no variance shall be revoked or modified without a written order stating the findings upon which denial, revocation, or modification is based. A copy of the order shall be sent to the applicant or variance holder by certified mail.

The director's hazardous waste standards shall be based on the degree of hazard potentially presented by particular wastes or categories of wastes and shall be designed to achieve a degree of protection consistent with the hazard represented by the various wastes or categories of wastes. In particular, standards for the design of disposal facilities, including, but not limited to, those specifying the thickness of clay liners, the number and placement of groundwater monitoring wells, and leachate and surface water monitoring facilities shall be consistent with the degree of hazard posed by the waste to be disposed of at the facility. Rules adopted under this section relating to hazardous waste disposal shall be consistent with and substantially equivalent to the hazardous waste disposal regulations promulgated under the "Resouce Conservation and Recovery Act of 1976," 90 Stat. 2806, 42 U.S.C. 6921, as amended, unless the director determines that the physical, chemical, or biological characteristics of a specific waste are so extremely hazardous that the waste's disposal under those regulations would present an imminent danger to human health or safety, in which case the director may prescribe, in accordance with Chapters 119. and 3745. of the Revised Code, disposal techniques more stringent than those in the regulations. Nothing in this section shall prevent the director from issuing rules in the absence of federal regulations.

No person shall violate any regulation adopted under this section.

3734.13

(A) The director of environmental protection may issue, modify, suspend, or revoke enforcement orders in accordance with Chapter 3745 of the Revised Code to a permit or license holder or other person, directing the holder or person to abate violation of any section of this chapter a rule adopted thereunder, or term or condition of a permit issued thereunder within a specified, reasonable time.

(B) If the director determines that an emergency exists requiring immediate action to protect the public health or safety or the environment, he may, without notice or hearing, issue an order reciting the existence of the emergency and requiring that such action be taken as necessary to meet the emergency. The order shall be effective immediately. Any person to whom the order is directed shall comply immediately, but on application to the director, shall be afforded a hearing as soon as possible, and not later than thirty days after application. On the basis of the hearing, the director shall continue the order in effect, revoke it, or modify it. No emergency order shall remain in effect for more than ninety days after its issuance.

(C) If the director determines that any person is violating or has violated this chapter, a rule adopted thereunder, or term or condition of a permit issued thereunder, the director may, without prior issuance of an order, request in writing that the attorney general bring a civil action for appropriate relief, including a temporary restraining order, preliminary or permanent injunction, and civil penalties in any court of competent jurisdiction. Such an action shall have precedence over all other cases. The court may impose upon the person a civil penalty of not more than ten thousand dollars for each day of each violation of this chapter, a rule adopted thereunder, or term or condition of a permit issued thereunder, which moneys shall be paid into the hazardous waste clean-up special account created in Section 3734.28 of the Revised Code.

Any action under this section is a civil action, governed by the rules of civil procedure and other rules of practice and procedure applicable to civil actions.

(D) No person shall violate any term or condition of any order issued under this section.

3734.14

The director of environmental protection shall periodically determine the market potential and feasibility of the exchange, use, and recovery of resources from hazardous waste. Using the information required under division (B) of Section 3734.12 of the Revised Code, the director shall, in compliance with the procedures adopted under division (G) of Section 3734.12 of the Revised Code pertaining to the protection of trade secrets, provide information on the availability of hazardous waste to persons who desire to acquire it and use or recover resources from hazardous waste. When necessary or desirable to facilitate the exchange and use of hazardous waste, the director may order exemptions from the requirements of this chapter in accordance with division (G) of Section 3734.02 of the Revised Code or issue variances from his regulations in accordance with division (H) of Section 3734.12 of the Revised Code.

3734.15

(A) No person shall transport hazardous waste anywhere in this state unless he or the business entity with which he is employed as a transporter has first registered with and obtained a registration certificate from the agency designated by rule of the director of environmental protection in accordance with division (C) of section 3734.12 of the Revised Code. No more than one registration certificate shall be required of any single business entity. The registrant shall pay to the registering agency such fee as the director establishes by rules adopted in accordance with Chapters 119. and 3745. of the revised code to reimburse the agency for the cost of issuing the certificate. The fee shall not exceed the actual cost to the agency of issuing the certificate.

For the purposes of this section, "registered transporter" means any person who is registered pursuant to this section or who is employed as a transporter by a business entity that is registered pursuant to this section.

(B) A registered transporter of hazardous waste shall be responsible for the safe delivery of any hazardous waste that he transports from such time as he obtains the waste until he delivers it to a treatment, storage, or disposal facility specified in division (F) of Section 3734.02 of the Revised Code, as recorded on the manifest required in division (B) of Section 3734.12 of the Revised Code. Any registered transporter who intentionally violates this chapter or any regulation adopted thereunder while transporting hazardous waste shall be liable for any damage or injury caused by the violation and for costs of rectifying the violation and conditions caused by the violation.

If the agency that issues registration certificates has reason to believe that a registered transporter has violated this chapter or any regulation adopted thereunder, it may suspend his registration certificate or the registration certificate of the business entity that employs him as a transporter. Following the suspension, the agency shall conduct an adjudication hearing in accordance with Chapter 119. of the Revised Code to determine if the transporter has committed such a violation. If, at the conclusion of the hearing, the agency finds that the transporter has violated this chapter or any rule adopted thereunder, it shall issue an order revoking his registration certificate or the registration certificate of the business entity that employs him as a transporter. An order revoking a certificate under this section may be appealed in accordance with applicable law. The director or his authorized representative may participate in the hearing.

(C) No person who generates hazardous waste shall cause the waste to be transported by any person who is not a registered transporter. No person shall knowingly accept for treatment, storage, or disposal any hazardous waste from an unregistered transporter. Any person who is requested to accept such waste for treatment, storage, or disposal shall notify the director, the board of health in his location, and the agency designated by the director under division (C) of Section 3734.12 of the Revised Code to register hazardous waste transporters of the request.

If a generator knowingly causes an unregistered transporter to transport the hazardous waste, the generator of the waste, the transporter, and any person who accepts the waste for treatment, storage, or disposal shall be jointly and severally liable for any damage or injury caused by the handling of the waste and for costs of rectifying their violation and conditions caused by their violation.

3734.16

A generator of hazardous waste who intentionally violates any of the regulations adopted by the director of environmental protection in accordance with division (B) of Section 3734.12 of the Revised Code shall be liable for any damage or injury caused by the violation and for costs of rectifying the violation and conditions caused by the violation.

3734.17

No person shall knowingly accept for transportation or for treatment, storage, or disposal any hazardous waste whose generator has violated any of the regulations adopted by the director of environmental protection in accordance with division (B) of Section 3734.12 of the Revised Code with respect to the waste. Any person who accepts for treatment, storage, or disposal any hazardous waste and who knowingly violates any of the regulations adopted by the director of the environmental protection in accordance with division (D) of Section 3734.12 of the Revised Code shall be liable for any damage or injury caused by the violation and for costs of rectifying the violation and conditions caused by the violation.

3734.18

There are hereby levied fees on the disposal of hazardous waste to be collected according to the following schedule at all disposal and treatment facilities to which the hazardous waste facility approval board has issued a hazardous waste facility installation and operation permit pursuant to Section 3734.05 of the Revised Code:

(A) For facilities located off the premises where hazardous waste is generated, a fee equal to six percent of each charge that the facility owner or operator makes for disposal of hazardous waste at the facility, to be paid in addition to the disposal charge. The owner or operator of the facility, as a trustee for the state, shall collect the fee and forward it to the director in accordance with rules adopted under this section.

(B) For facilties located on the premises where hazardous waste is generated, an annual fee of two thousand dollars for each disposal facility up to five acres in size and four hundred dollars for each additional acre, or five thousand dollars for each deep well at a disposal facility, or a combination of these amounts. The total annual fee for each such disposal facility shall not exceed ten thousand dollars. The owner or operator shall pay the fee to the director each year upon the anniversary of the date of issuance of his installation and operation permit during the term of the permit. If his payment is late, the owner or operator shall pay an additional ten percent of the amount of the fee for each month that it is late.

The director, by rules adopted in accordance with Chapters 119. and 3745. of the Revised Code, shall prescribe the dates and procedures for collecting and forwarding the fees prescribed by this section and may prescribe other requirements that are necessary to carry out this section.

The director shall deposit the moneys collected under this section into one or more minority banks, as "minority bank" is defined in division (G)(1) of Section 135.04

of the Revised Code, to the credit of the hazardous waste facility management special account in the state special revenue fund, which special account is hereby created.

(C) Prior to the beginning of each fiscal year, the director of environmental protection shall adjust the fees charged under division (A) of this section so that the total fees collected under this section together with the total fees collected under division (E) of section 3734.02 of the Revised Code provide the revenue necessary to operate at the appropriation level for the fiscal year made by the general assembly from the hazardous waste facility management special account. The fees charged under division (A) of this section shall be reduced if the director determines that they will produce revenues in excess of what is necessary to operate at the appropriation level made by the general assembly. The fees established under this division shall not require rule-making for implementation, and shall take effect immediately at the beginning of each fiscal year.

The environmental protection agency and the hazardous waste facility approval board may use moneys in the special account for administration of the hazardous waste program established under this chapter and, in accordance with this section, may request approval by the controlling board for such use on an annual basis. In addition, the environmental protection agency may use and pledge moneys in the special account for repayment of and for interest on any loans made by the Ohio Water Development Authority to the environmental protection agency for the hazardous waste program established under this chapter without the necessity of requesting approval by the controlling board, which use and pledge shall have priority over any other use of the moneys in the special account.

If moneys in the special account that the agency uses in accordance with this chapter are reimbursed by grants or other moneys from the United States Government, the grants or other moneys shall be placed in the special account and not in the general revenue fund.

Before the environmental protection agency makes any expenditure from the special account other than for repayment of and interest on any loan made by the Ohio Water Development Authority to the environmental protection agency with this section, the controlling board shall approve the expenditure.

3734.19

If a municipal corporation, county, or township has evidence to indicate that locations within its boundaries once served as hazardous waste facilities or that significant quantities of hazardous waste were disposed of in solid waste facilities within its boundaries, it may request a board of health within its boundaries to file a formal written request with the director of environmental protection to survey the locations or facilities. If a majority of the members of the board approve the request from the municipal corporation, county, or township, the board shall file a formal written request together with such documented evidence for each location or facility as the director requires by rules adopted by him in accordance with Chapters 119. and 3745. of the Revised Code.

Upon receipt of a request, the director shall conduct an investigation to determine if hazardous waste was actually treated, stored, or disposed of at the locations or facilities and, if so, to determine the nature and approximate quantity and types of the waste treated, stored, or disposed of at the particular locations or facilities. In addition, the director shall determine whether the locations or facilities, because of their present condition and the nature and quantities of waste treated, stored, or disposed of therein, result or are likely to result in air pollution or pollution of the waters of the state or constitute a present or imminent and substantial threat to public health or safety. The director shall report the findings of his investigation to the municipal corporation, county, or township and the board of health requesting the survey.

For the purpose of conducting investigations under this section, the director or his authorized representative may enter upon any public or private property. If entry is refused or an investigation is refused, hindered, or thwarted, the director or his authorized representative may apply for, and any judge of a court of common pleas shall issue, an appropriate inspection warrant necessary to achieve the purposes of this section within the court's territorial jurisdiction. When conducting investigations under this section, the director shall cause no unnecessary damages to any property and shall be liable for any damages actually done to any property. The director may expend moneys from the hazardous waste facility clean-up special account created in Section 3734.28 of the Revised Code for conducting investigations and for payment of any damages actually done to property while conducting investigations under this section.

3734.20

If the director of environmental protection determines that the condition of a hazardous waste facility or a solid waste facility constitutes a substantial threat to public health or safety or results in air or water pollution, he shall initiate appropriate action under this Chapter or Chapter 3704. or 6111. of the Revised Code or seek any other appropriate legal or equitable remedies to abate the pollution or to protect public health or safety.

If an order of the director to abate air or water pollution caused by the condition of such a facility issued pursuant to Chapter 3704. or 6111. of the Revised Code is not wholly complied with within the time prescribed in the order, the director may, through officers or employees of the agency or through contractors employed for that purpose, enter upon the facility and perform those measures necessary to abate or prevent air or water pollution from the facility or to protect public health or safety. At least thirty days prior to entering upon the facility, the director shall issue to the owner thereof an order in accordance with Chapter 3745. of the Revised Code stating that, unless the owner fully complies with the order to abate air

or water pollution from the facility or eliminate conditions thereon that threaten public health or safety, the director will enter upon the facility and perform the measures necessary to abate the conditions. If the owner agrees to perform within a reasonable period of time the measures prescribed in the order, the director shall grant such time for compliance with the order. If, at the expiration of the specified time for compliance, the owner has not fully complied with the order, the director may enter upon the facility and perform, or cause to be performed, the measures prescribed in the order. The director shall keep an itemized record of the costs of any work performed, including costs for labor, materials, and any contract services required. Upon completion of the measures prescribed in the order, the director shall certify the cost of performing them to the county auditor of the county in which the facility is located. The auditor shall record the cost so certified as a lien against the property on which the facility is located, which cost shall be a lien on the property. The attorney general may institute a civil action to recover the cost. Any moneys so received shall be credited to the hazardous waste clean-up special account created in Section 3734.28 of the Revised Code.
Code.

When entering upon a facility under this section, the director shall perform or cause to be performed only those measures necessary to abate or prevent air or water pollution caused by the facility or to abate threats to public health or safety caused by the condition of the facility. For this purpose the director may expend moneys from the hazardous waste facility management special account and may expend moneys from loans from the Ohio Water Development Authority to the environmental protection agency that pledge moneys from ıe special account for the repayment of and for the in-.erest on such loans.

3734.21

(A) The director of environmental protection may expend moneys credited to the hazardous waste clean-up special account created in Section 3734.28 of the Revised Code for the payment of the cost of measures necessary for the proper closure of hazardous waste facilities or any solid waste facilities containing significant quantities of hazardous waste, for the payment of costs of the development and construction of suitable hazardous waste facilities required by division (B) of Section 3734.23 of the Revised Code to the extent the Director of Environmental Protection determines that such facilities are not available, and for the payment of costs that are necessary to abate conditions thereon that result in air or water pollution or that constitute a substantial threat to public health or safety. In addition the director of environmental protection may expend and pledge moneys credited to the special account for repayment of and for interest on any loan made by the Ohio Water Development Authority to the Environmental Protection Agency for the payment of such costs.

(B) Before beginning to restore any facility under this section, the director shall develop a plan for the restoration and an estimate of the cost thereof. The plan shall include only those measures necessary to abate conditions thereon that result in air or water pollution or that constitute a substantial threat to public health or safety, including, but not limited to, establishment and maintenance of an adequate cover of soil and vegetation on any facility for the burial of hazardous waste to prevent the infiltration of water into cells where hazardous waste is buried, the accumulation or runoff of contaminated surface water, the production of leachate, and air emissions of hazardous waste; the collection and treatment of contaminated surface water runoff; the collection and treatment of leachate; or, if conditions so require, the removal of hazardous waste from the facility and the treatment or disposal of the waste at a suitable hazardous waste facility. The plan or any part of the plan for the restoration of the facility shall be carried out by entering into contracts therefor.

3734.22

Before beginning to restore any facility under Section 3734.21 of the Revised Code, the Director of Environmental Protection shall endeavor to enter into an agreement with the owner of the land on which the facility is located specifying the measures to be performed and authorizing the director, employees of the agency, or contractors retained by the director to enter upon the land and perform the specified measures.

Each agreement shall contain provisions for the reimbursement of the state for a portion of the costs of the reclamation that is commensurate with the increase in the market value of the property attributable to the reclamation work thereon, as determined by appraisals made before and after reclamation in the manner stated in the agreement. For reimbursement of that portion, the agreement may include provisions for:

(A) Payment to the state of the share of the income derived from the productive use of the land for agriculture, forestry, commerce, or industry as stated in the agreement;

(B) Imposition of a lien in the amount of the increase in fair market value payable upon the transfer or conveyance to a new owner;

(C) Waiver of all reimbursement if the determination discloses an increase in value that is insubstantial in comparison to the benefits to the public from the abatement of threats to public health or safety or from the abatement or prevention of pollution.

All reimbursements and payments shall be credited to the hazardous waste clean-up special account created in Section 3734.28 of the Revised Code.

The agreement may require the owner to execute an easement whereby the director, an authorized employee of the agency, or a contractor employed by the agency may enter upon the facility to sample, repair, or reconstruct air and water quality monitoring equipment

constructed under the agreement. Such easements shall be for a specified period of years and may be extinguished by agreement between the owner and the director. When necessary to protect the public health or safety, the agreement may require the owner to execute a restrictive covenant to run with the land that specifies the uses that may be made of the facility after work performed is completed, specifies the period for which the restrictive covenant applies, and provides terms whereby modifications to the restrictive covenant, or other land uses, may be initiated or proposed to the director by the owner or by subsequent owners of the facility. All easements or covenants required under this section shall be recorded in the office of the county recorder of the county in which the facility is located, and the recording fees shall be paid by the director.

3734.23

(A) The Director of Environmental Protection may purchase, acquire by gift, donation, or contribution, or appropriate in accordance with Sections 163.01 to 163.21 of the Revised Code any hazardous waste facility or any solid waste facility containing significant quantities of hazardous waste that, because of its condition and the types and quantities of hazardous waste contained in the facility, constitutes an imminent and substantial threat to public health or safety or results in air pollution or pollution of the waters of the state. Before purchasing or acquiring such a facility, the director shall exhaust all available remedies under Chapter 3704. or 6111. or Section 3734.20 of the Revised Code and any other available legal or equitable remedies to abate the pollution or protect public health or safety. For this purpose, the director may expend moneys from the hazardous waste clean-up special account created in Section 3734.18 of the Revised Code and may expend moneys from loans from the Ohio Water Development Authority to the environmental protection agency that pledge moneys from the special account for the repayment of and for the interest on such loans. Any lands or facilities purchased or acquired under this section shall be deeded to the state, but no deed shall be accepted or the purchase price paid until the title has been approved by the attorney general.

(B) The director shall, with respect to any land or facility acquired under this section, perform those measures necessary to abate conditions thereon that result in air or water pollution or that constitute a substantial threat to public health or safety, including, but not limited to, establishment and maintenance of an adequate cover of soil and vegetation on any facility for the burial of hazardous waste to prevent the infiltration of water into cells where hazardous waste is buried, the accumulation or runoff of contaminated surface water, the production of leachate, and air emissions of hazardous waste; the collection and treatment of contaminated surface water runoff; the collection and treatment of leachate; or, if conditions so require, the removal of hazardous waste from the facility and the treatment or disposal of the waste at a suitable hazardous waste facility. After performing these measures, the director shall provide for the long-term care, maintenance, and monitoring of facilities reclaimed under this section.

(C) Before proceeding to reclaim any facility under this section, the director shall develop a plan for the restoration of the facility and an estimate of the cost thereof. The director may carry out the plan or any part of the plan by contracting therefor. The director shall award each such contract to the lowest responsible bidder after sealed bids therefor are received, opened, and published at the time fixed by the director and notice of the time and place at which the sealed bids will be received, opened, and published has been published by the director in a newspaper of general circulation in the county in which the facility to be reclaimed under the contract is located at least once within the ten days before the opening of the bids. However, if after advertising for bids for the contract, no bids are received by the director at the time and place fixed for receiving them, the director may advertise again for bids, or he may, if he considers the public interest will best be served thereby, enter into a contract for the restoration of the facility without further advertisement for bids. The director may reject any or all bids received and fix and publish again notice of the time and place at which bids for the contracts will be received, opened, and published.

3734.24

After the reclamation of a solid waste facility or a hazardous waste facility acquired and reclaimed under Section 3734.23 of the Revised Code, the Director of Environmental Protection may, if the facility is suitable for use by any other state department, agency, office, or institution and if the proposed use of the facility is compatible with the condition of the facility as reclaimed, transfer the facility to that state department, agency, office, or institution. The director shall continue to provide for the long-term care, maintenance, and monitoring of any such reclaimed facility as required by Section 3734.23 of the Revised Code.

If the director determines that any facility so reclaimed is suitable, because of its condition as reclaimed, for restricted or unrestricted use, he may, with the approval of the attorney general, sell the facility if the sale is advantageous to the state. Prior to selling the reclaimed facility, the director shall, when necessary to protect public health or safety, execute a restrictive covenant to run with the land that specifies the uses that may be made of the facility, specifies the period for which the restrictive covenant applies, and provides terms whereby modifications to the restrictive covenant, or other land uses, may be initiated or proposed to the director by subsequent owners of the facility. When selling any such reclaimed facility, the director shall retain the right to enter upon the facility, in person or by his authorized agent, to provide for the long-term care, maintenance, and monitoring of the facility. The director shall provide for the long-term care, maintenance, and monitoring of

any such facility sold as required by Section 3734.23 of the Revised Code.

With the approval of the attorney general, the director may grant easements or leases on any such reclaimed facility if he determines that the use of the facility under the easement or lease is compatible with its condition as reclaimed.

Any moneys derived from the sale of such reclaimed facilities or from payments from easements or leases shall be credited to the hazardous waste clean-up special account created in Section 3734.28 of the Revised Code.

3734.25.

(A) The Director of Environmental Protection may make grants of moneys from the hazardous waste clean-up special account created in Section 3734.28 of the Revised Code for payment by the state of up to two-thirds of the reasonable and necessary expenses incurred by a municipal corporation, county, or township for the proper closure of or abatement of air or water pollution from a solid waste facility in which significant quantities of hazardous waste were disposed of and that the political subdivision owns and once operated.

(B) A municipal corporation, county, or township shall submit an application for a grant on forms provided by the director, together with detail plans and specifications indicating the measures to be performed, an itemized estimate of the project's cost, a description of the project's benefits, and such other information as the director prescribes. The plan for closure or abatement of air or water pollution may be prepared in consultation with the director or the board of health of the city or general health district in which the facility is located. The director may award the applicant a grant only if he finds that the proposed measures will provide for the proper closure of the facility and will abate or prevent air or water pollution, including, but not limited to, those measures necessary or desirable to:

(1) In the case of a facility at which land burial of hazardous waste occurred, establish and maintain a suitable cover of soil and vegetation over the cells in which waste is buried in order to minimize erosion, the infiltration of surface water into the cells, the production of leachate, and the accumulation or runoff of contaminated surface waters and to prevent air emissions of hazardous waste from the facility;

(2) Collect and treat contaminated surface water runoff from the facility;

(3) Collect and treat leachate produced at the facility;

(4) Install test wells and other equipment or facilities to monitor the quality of surface waters receiving runoff from the facility or to monitor air emissions of hazardous waste from the facility;

(5) Regularly monitor and analyze surface water runoff from the facility, the quality of waters receiving the runoff, and groundwater quality in the vicinity of the facility, and regularly monitor leachate collection and treatment systems installed under the grant and analyze samples from them;

(6) The removal and disposal at a suitable hazardous waste disposal facility of hazardous waste from the facility where necessary to protect public health or safety or to prevent or abate air or water pollution caused by the facility.

(C) The director shall determine the amount of the grant based upon his determination of what constitutes reasonable and necessary expenses for the proper closure of the facility or for the prevention or elimination of air or water pollution from the facility. In making a grant, the director shall enter into a contract with the municipal corporation, county, or township that owns the facility in order to ensure that the moneys granted are used for the purposes of this section and that measures performed are properly done. The final payment under a grant may not be made until the director inspects and approves the completed reclamation work.

The contract shall require the municipal corporation, county, or township to execute an easement whereby the director, an authorized employee of the agency, or a contractor employed by the director may enter upon the facility to sample, repair, or reconstruct air and water quality monitoring equipment constructed under the contract. Such easements shall be for a specified period of years and may be extinguished by agreement between the political subdivision and the director.

When necessary to protect public health or safety, the contract may require the municipal corporation, county, or township to execute a restrictive covenant to run with the land that specifies the uses that may be made of the facility after work performed under the contract is completed, specifies the period for which the restrictive covenant applies, and provides terms whereby modifications to the restrictive covenant, or other land uses, may be initiated or proposed to the director by the political subdivision or by subsequent owners of the facility. Any easements or covenants required under this section shall be recorded in the office of the county recorder of the county in which the facility is located, and the recording fees shall be paid by the recipient of the grant.

3734.26.

(A) The Director of Environmental Protection may make grants of moneys from the hazardous waste clean-up special account created in Section 3734.28 of the Revised Code to the owner, other than a political subdivision, of a solid waste facility in which significant quantities of hazardous waste were disposed of or a hazardous waste facility for the payment by the state for up to fifty per cent of the cost of the reasonable and necessary expenses incurred for the proper closure of or abatement or prevention of air or water pollution from the facility and for developing the land on which it was located for use in industry, commerce, distribution, or research.

The director may not make grants to the owner of any land on which such facilities are located if he determines that the present owner of the land owned and operated the facility located thereon for profit or in conjunction

with any profit-making enterprise located in this state. However, the director may make grants under this section to any subsequent owner of the land.

(B) The owner shall submit an application for a grant on forms furnished by the director, together with detail plans and specifications for the measures to be performed to close the facility properly or to abate or prevent air or water pollution from the facility, an itemized estimate of the project's cost, a description of the project's estimated benefits, and such other information as the director prescribes. The plan may be prepared in consultation with the director or with the board of health of the city or general health district in which the facility is located. The director may award the applicant a grant only if he finds that the proposed measures will provide for the proper closure of the facility or will abate or prevent air or water pollution from the facility, including, but not limited to, those measures necessary or desirable to:

(1) In the case of a facility for the land burial of hazardous waste, establish and maintain a suitable cover of soil and vegetation over the cells in which waste is buried in order to minimize erosion, the infiltration of surface water into the cells, the production of leachate, and the accumulation or runoff of contaminated surface water and to prevent air emissions of hazardous waste from the facility;

(2) Collect and treat contaminated surface water runoff from the facility;

(3) Collect and treat leachate produced at the facility;

(4) Install test wells and other equipment or facilities to monitor the quality of surface waters receiving runoff from the facility or to monitor air emissions of hazardous waste from the facility;

(5) Regularly monitor and analyze surface water runoff from the facility, the quality of waters receiving the runoff, and groundwater quality in the vicinity of the facility, and regularly monitor leachate collection and treatment systems installed under the grant and analyze samples from them;

(6) The removal and disposal at a suitable hazardous waste disposal facility of hazardous waste from the facility where necessary to protect public health or safety or to abate or prevent air or water pollution caused by the facility.

(C) The director shall determine the amount of the grant based upon his determination of what constitutes reasonable and necessary expenses for the proper closure of the facility or for the abatement or prevention of air or water pollution from the facility. The amount of the grant shall not exceed one-half of the total, as determined by the director, of what constitutes reasonable and necessary expenses actually incurred for the proper closure of or abatement or prevention of air or water pollution from the facility.

In making a grant, the director shall enter into a contract for funding with each applicant awarded a grant in order to ensure that the moneys granted are used for the purpose of this section and that the measures performed are properly done. The final payment under a grant may not be made until the director inspects and approves the completed reclamation work and the plans for developing the land for use in industry, commerce, distribution, or research.

Each contract for funding shall contain provisions for the reimbursement of a portion of the costs of the reclamation that is commensurate with the increase in the market value of the property attributable to the reclamation work thereon, as determined by appraisals made before and after reclamation in the manner stated in the contract. For reimbursement of that portion, the contract may include provisions for:

(1) Payment to the state of the share of the income derived from the productive use of the land;

(2) Imposition of a lien in the amount of the increase in fair market value payable upon the transfer or conveyance to a new owner;

(3) Waiver of all reimbursement if the determination discloses an increase in value that is insubstantial in comparison to the benefits to the public from the abatement of threats to public health or safety or from the abatement or prevention of pollution, considering the applicant's share of the reclamation cost.

All reimbursements and payments shall be credited to the hazardous waste clean-up special account created in Section 3734.28 of the Revised Code.

(D) The contract shall require the owner to execute an easement whereby the director, an authorized employee of the agency, or a contractor employed by the agency may enter upon the facility to sample, repair, or reconstruct air and water quality monitoring equipment constructed under the contract. Such easements shall be for a specified period of years and may be extinguished by agreement between the owner and the director. When necessary to protect the public health or safety, the contract may require the owner to execute a restrictive covenant to run with the land that specifies the uses that may be made of the facility after work performed under the grant is completed, specifies the period for which the restrictive covenant applies, and provides terms whereby modifications to the restrictive covenant, or other land uses, may be initiated or proposed to the director by the owner or by subsequent owners of the facility. All easements or covenants required under this section shall be recorded in the office of the county recorder of the county in which the facility is located, and the recording fees shall be paid by the owner.

(E) As used in this section, "commerce" includes, but is not limited to, agriculture, forestry, and housing.

3734.27

Before making grants from the hazardous waste clean-up special account created in Section 3734.28 of the Revised Code, the Director of Environmental Protection shall consider each project application submitted by a political subdivision under Section 3734.25 of the Revised Code, each application submitted by the owner of a facility under Section 3734.26 of the Revised

Code, and each facility surveyed under Section 3734.19 of the Revised Code and, based upon the feasibility, cost, and public benefits of restoring the particular land and the availability of federal or other financial assistance for restoration, establish priorities for awarding grants from the special account.

3734.28

There is hereby created the hazardous waste clean-up special account in the state special revenue fund. All moneys collected under sections 3734.13, 3734.20, 3734.22, 3734.24, and 3734.26 of the Revised Code shall be paid into the state treasury to the credit of the special account. The environmental protection agency shall use the moneys in the special account only for the purposes set forth in sections 3734.19, 3734.20, 3734.21, 3734.23, 3734.25, 3734.26, and 3734.27 of the Revised Code.

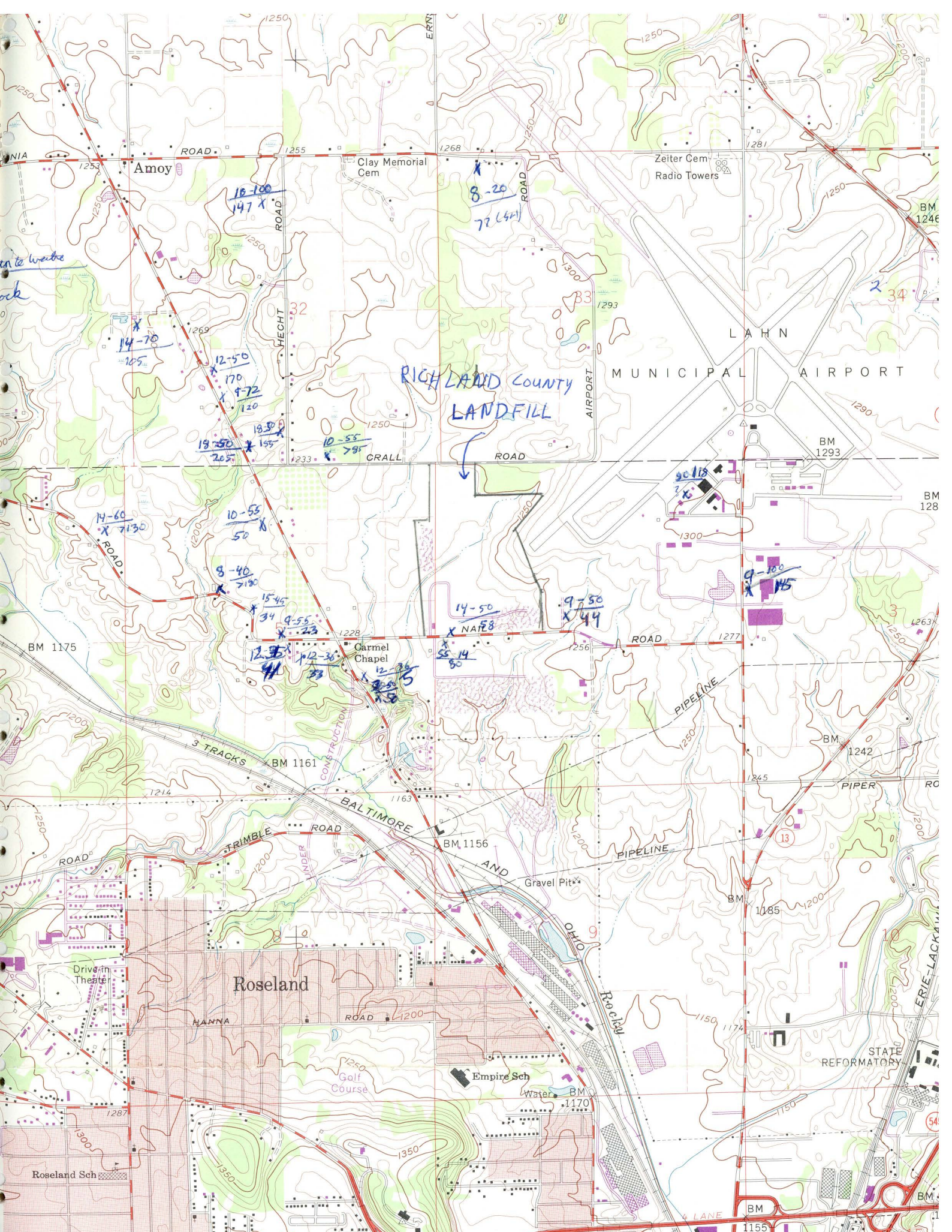
3734.99

(A) Except as otherwise provided in division (B) of this section, whoever knowingly violates any section of this chapter, governing the storage, treatment, transportation, or disposal of hazardous waste is guilty of a felony shall be fined not more than twenty-five thousand dollars or imprisoned for not more than two years, or both. Whoever violates any section of this chapter governing the disposal of solid wastes, or violates section 3734.18 of the Revised Code, shall be fined not more than two hundred fifty dollars. Each day of violation constitutes a separate offense.

(B) Upon the second or subsequent conviction for a violation of any section of this chapter governing the storage, treatment, transportation, or disposal of hazardous waste, the person shall be fined not more than fifty thousand dollars per day of violation or imprisoned for not more than two years, or both.

APPENDIX B

Well logs from Water Wells Drilled in the Area of the Richland County Landfill


Amoy
Clay Memorial Cem
Zeiter Cem
Radio Towers
ROAD
HECHT
CRALL
AIRPORT
LAHN
MUNICIPAL
AIRPORT
RICHLAND COUNTY
LANDFILL
BM 1293
BM 1246
BM 1175
BM 1161
BM 1156
BM 1242
BM 1185
BM 1170
BM 1155
Carmel Chapel
3 TRACKS
BALTIMORE AND OHIO
Rocky
PIPELINE
PIPER
CONSTRUCTION
TRIMBLE ROAD
Gravel Pit
Roseland
HANNA ROAD
Drive-in Theatre
Golf Course
Empire Sch
Water
Roseland Sch
STATE REFORMATORY
ERIE-LACKAWA
4 LANE

WELL LOG AND DRILLING REPORT

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State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 386299

County RICHLAND Township FRANKLIN Section of Township 32

Owner FIRST Church of GOD Address 2535 Bowman Rd Mansfield O

Location of property W SIDE of Bowman St. Rd. ± mi, North of Hecht Rd

CONSTRUCTION DETAILS

Casing diameter 4½ Length of casing 105

Type of screen Length of screen

Type of pump DEEP WELL

Capacity of pump 10 GPM

Depth of pump setting 84

Date of completion 6-11-71

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 14 G.P.M. Duration of test 2 hrs.

Drawdown 0 ft. Date 6-11-71

Static level-depth to water 70' ft.

Quality (clear, cloudy, taste, odor)

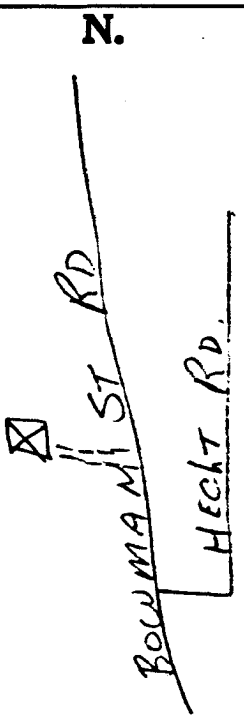
Pump installed by DRILLER

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Top Soil	0 Feet	1 Ft.
Yellow Clay	1	26
Blue Clay Sand & Gravel	26	90
Yellow Sand	90	105
Yellow Sand Stone	105	110

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm W H Burnett Date 6-11-71

Address RD 2 Shiloh O. Signed W H Burnett

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 415635

County RICHLAND Township FRANKLIN Section of Township 32

Owner KENNETH CLINE % E+L CONSTRUCTION Address 2300 MANSFIELD LUCAS RD

Location of property NORTH OF CRALL RD ON EAST SIDE OF BOWMAN ST RD

CONSTRUCTION DETAILS

Casing diameter 5" Length of casing 40'-1"
Type of screen — Length of screen —
Type of pump DEEP WELL JET
Capacity of pump
Depth of pump setting
Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

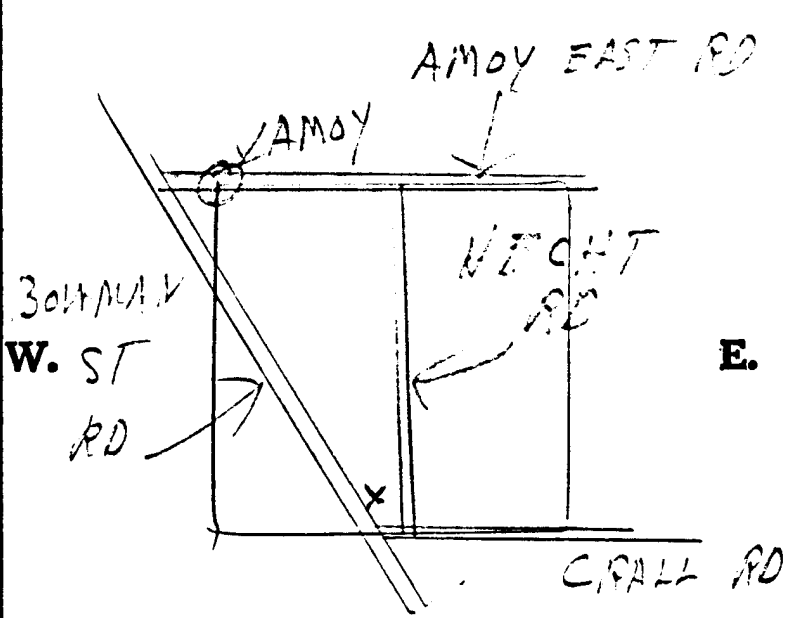
Test Rate 12 G.P.M. Duration of test 1 1/2 hrs.
Drawdown 5 ft. Date 9-12-71
Static level-depth to water 50' ft.
Quality (clear, ~~cloudy, taste, odor~~)
Pump installed by SALTZGABER DRILLING CO

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
CLAY - GRAVEL	0 Feet	120 Ft.
GRAVEL - SAND	120	130
BLUE CLAY	130	205
HARD ROCK		
W/SHALE STREAKS	205	234

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm SALTZGABER DRILLING CO. 57 SOUTH MARKET AVE.
Address MANSFIELD, OHIO
Date JULY 12, 1971
Signed J. RON SALTZGABER

*If additional space is needed to complete well log, use next consecutive numbered form.

1988 2[illegible]

422 4[illegible]N

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

No 147787

County Richland Township Franklin Section of Township or Lot Number 32

Owner Miss Leppo Address Amon-Paramus

Location of property On Hewett Rd between Amon-Paramus & Ewell Rd

CONSTRUCTION DETAILS

Casing diameter 4½ Length of casing 147

Type of screen Length of screen

Type of pump 3½ HP Lub

Capacity of pump 10 G.P.M.

Depth of pump setting 126

PUMPING TEST

Pumping rate 10 G.P.M. Duration of test 1 hrs

Drawdown 0 ft. Date Jan. 5, 1956

Developed capacity 150 G.P.M.

Static level—depth to water 100 ft

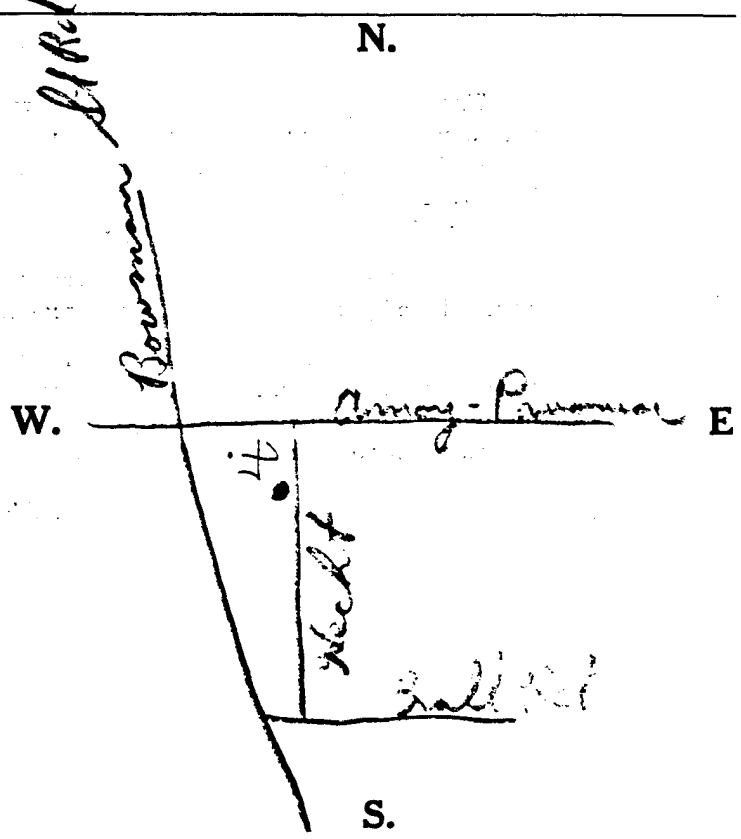
Pump installed by W. Elmer Jamison

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
yellow clay	0 Feet	25 Ft.
blue mud & gravel	25	147
yellow sandstone	147	163

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Jamison Drilling Co Date Jan 5 1956

Address 239 Rowland Rd Signed W. Elmer Jamison

Mansfield

WELL LOG AND DRILLING REPORT

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

453541

County RICHLAND Township FRANKLIN Section of Township 32

Owner E+L CONSTRUCTION Address 2299 MANSFIELD-WASHINGTON RD-MANS

Location of property APPROX ½ MILE NO. OF CODELL RD ON EAST SIDE OF BOWMAN ST RD

CONSTRUCTION DETAILS

Casing diameter 4½ Length of casing [illegible]

Type of screen — Length of screen —

Type of pump DEEP WELL SUB

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 7 G.P.M. Duration of test 1½ hrs.

Drawdown 57 ft. Date 7-27-73

Static level-depth to water 72 ft.

Quality (clear, ~~cloudy, taste, odor~~):

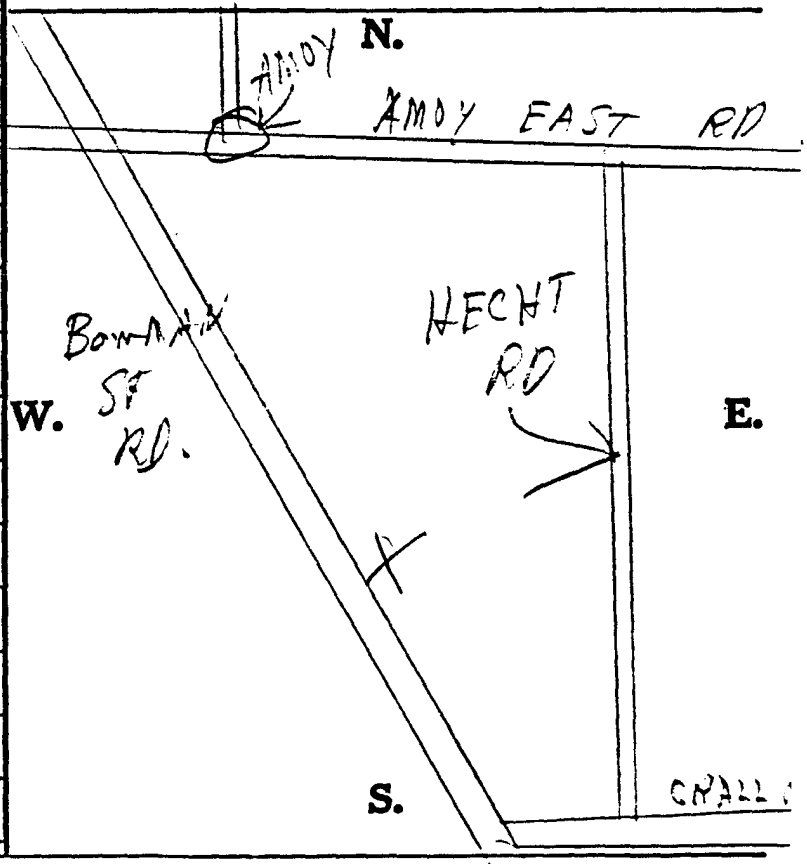
Pump installed by SALTZGABER DRILLING CO

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
CLAY & GRAVEL	0 Feet	90 Ft.
GRAY SAND ROCK & SHALE	90	120
YELLOW SAND ROCK	120	130
GRAY SAND ROCK	130	200

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm SALTZGABER DRILLING CO

Address

Date Aug 18 1973

Signed JOHN SALTZGABER

*If additional space is needed to complete well log, use next consecutive numbered form.

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

453521

County RICHLAND Township FRANKLIN Section of Township 32

Owner F & L CONSTRUCTION Address 2299 MANSFIELD LUCAS RD

Location of property APPROX ½ MILE NO OF CRALL RD ON EAST SIDE OF BOWMAN

CONSTRUCTION DETAILS

Casing diameter 4" Length of casing 170-2

Type of screen — Length of screen —

Type of pump DEEP WELL SUB

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 12 G.P.M. Duration of test 1/2 hrs.

Drawdown 10 ft. Date 6-12-73

Static level-depth to water 50 ft.

Quality (clear, ~~cloudy, taste, odor~~)

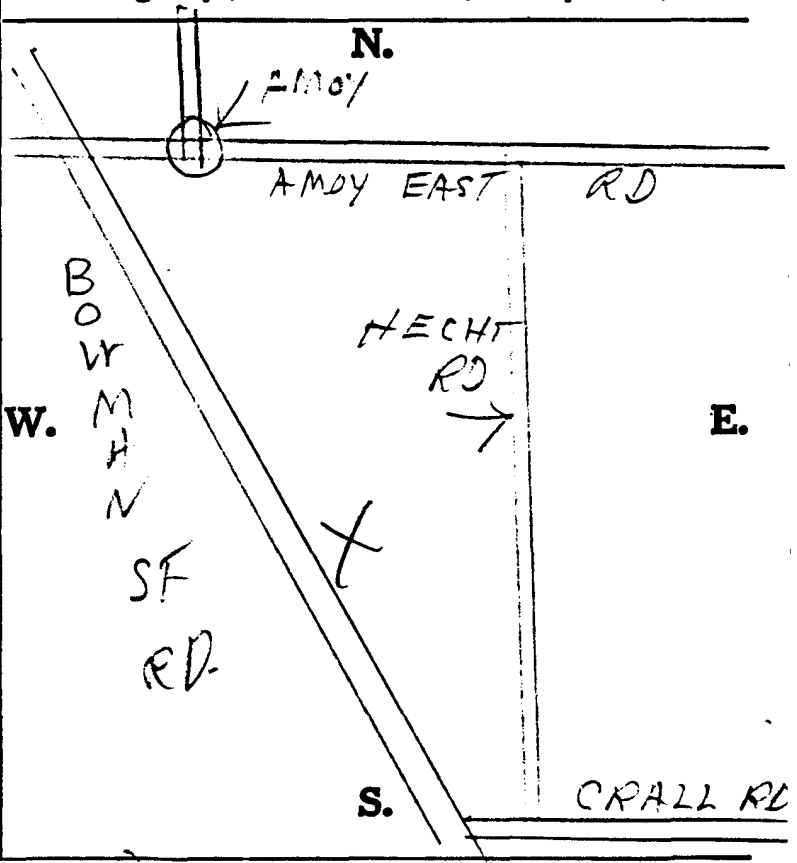
Pump installed by SALTZGABER DRILLING CO

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
YELLOW CLAY	0 Feet	Ft.
SAND & GRAVEL		8
BLUE CLAY-SAND & GRAVEL	8	97
BOULDERS	97	100
BLUE CLAY W/ STREAKS OF ROCK	100	170
GRAY SHALE ROCK	170	200

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm SALTZGABER DRILLING CO.

Address [illegible]

Date June 20 1973

Signed [illegible]

*If additional space is needed to complete well log, use next consecutive numbered form.

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 376536

County RICHLAND Township FRANKLIN Section of Township 32

Owner JACK MIDDLEBROOK Address 358 ORANGE ST. - MANSF, O.

Location of property NORTH OF CRALL RD ON WEST SIDE OF HECHT RD

CONSTRUCTION DETAILS

Casing diameter 4 " Length of casing 165'-0"
Type of screen — Length of screen —
Type of pump
Capacity of pump
Depth of pump setting
Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

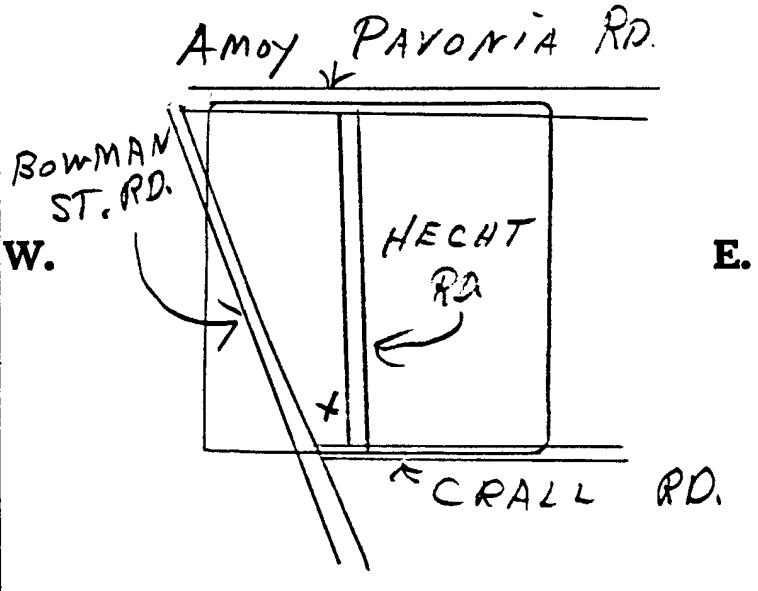
Test Rate 18 G.P.M. Duration of test 2 hrs.
Drawdown 2 ft. Date 7-18-68
Static level-depth to water 50 ft.
Quality (clear, ~~cloudy, taste, odor~~)
Pump TO BE installed by SALTZGABER DRILLING CO

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
CLAY-SAND-GRAVEL	0 Feet	155 Ft.
SAND ROCK	155	199

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm SALTZGABER DRILLING CO.
Address 57 SOUTH FRANKLIN AVE. MANSFIELD, OHIO

Date July 20 1968
Signed Ron Saltzgaber

*If additional space is needed to complete well log, use next consecutive numbered form.

X 1992300
500 ± 1
4230000N

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

No 77440

County Richland Township Franklin Section of Township or Lot Number 33

Owner Mrs W. Carter Address Amoz Pavonia Rd.

Location of property Amoz Pavonia Rd.

CONSTRUCTION DETAILS

Casing diameter 4" Length of casing 77'

Type of screen Length of screen

Type of pump 4/0 Sub.

Capacity of pump 6 G.P.M.

Depth of pump setting 63'

PUMPING TEST

Pumping rate 8 G.P.M. Duration of test 1 hrs.

Drawdown 90 ft. Date

Developed capacity 8 G.P.M.

Static level—depth to water 20 ft.

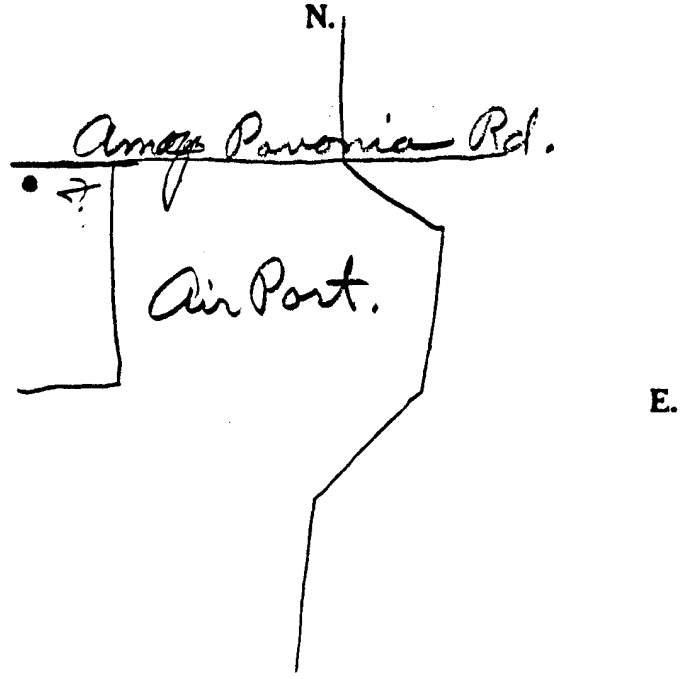
Pump installed by W. M. Jamison

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From 0 Feet	To ..... Ft.
Yellow clay		8
Blue clay	8	77
Shale	77	95

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm W. M. Jamison Date July 8, 1952

Address 239 Borland Rd. Signed W. M. Jamison

WELL LOG AND DRILLING REPORT

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 390164

County RICHLAND Township FRANKLIN Section of Township 34

Owner MANSFIELD METAL TREATING Co Address 2472 N. MAIN ST. - MANSFIELD, OHIO

Location of property SAME AS ADDRESS

CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 83'-9"

Type of screen ——— Length of screen ———

Type of pump DEEP WELL SUB

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 20 G.P.M. Duration of test 2 hrs.

Drawdown 45 ft. Date 7-18-69

Static level-depth to water 110 ft.

Quality (clear, ~~cloudy, taste, odor~~)

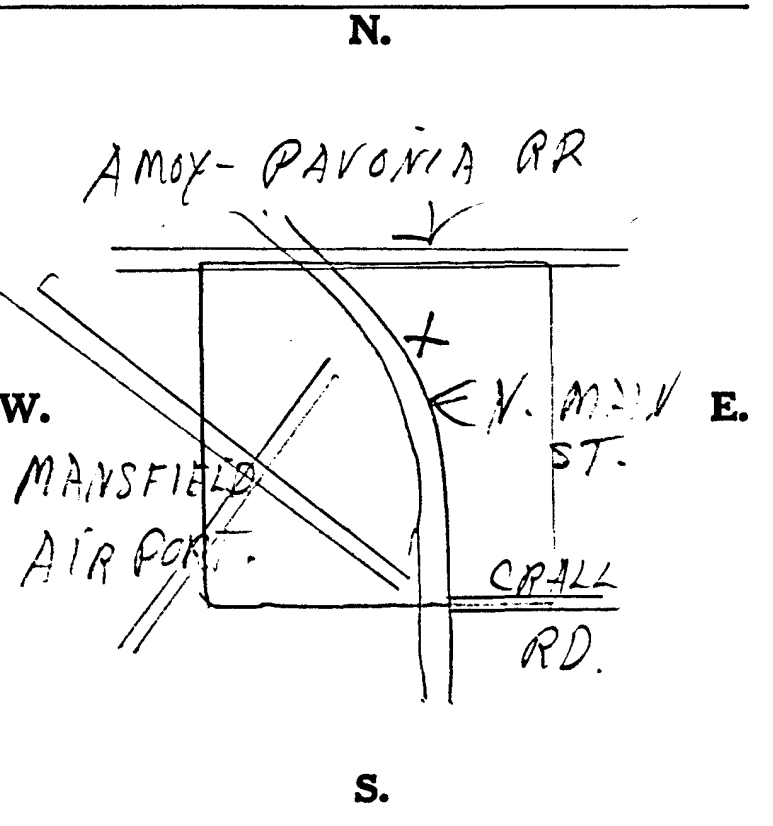
Pump installed by SALTZGABER DRILLING CO

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
CLAY-SAND-GRAVEL	0 Feet	35 Ft.
SOFT SHALE	35	75
GRAY ROCK		
STREAKS W/SHALE	75	300

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm SALTZGABER DRILLING CO.

Address 57 SOUTH FRANKLIN AVE. MANSFIELD, OHIO

Date Aug. 2, 1969

Signed [signature]

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 398148

County RICHLAND Township FRANKLIN Section of Township 34

Owner MANSFIELD METAL TREATING CO. Address 2472 N. MAIN ST. MANSF., O.

Location of property EAST SIDE OF ST. RT. 13 NORTH OF CRALL RD.

CONSTRUCTION DETAILS

Casing diameter 6" Length of casing ?

Type of screen — Length of screen —

Type of pump DEEP WELL SUB

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 15 G.P.M. Duration of test 1/2 hrs.

Drawdown 5 ft. Date 4-3-70

Static level-depth to water 125 ft.

Quality (clear, ~~cloudy, taste, odor~~)

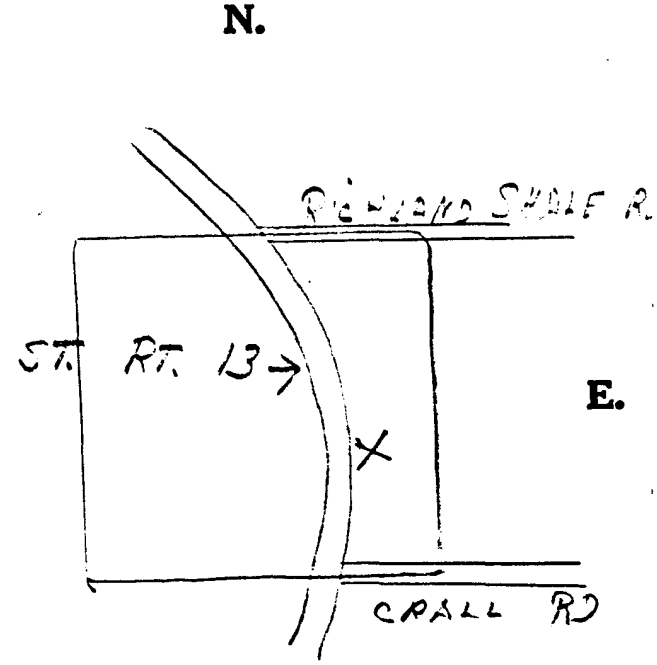
Pump installed by SALTZGABER DRILLING CO.

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
OLD WELL	0 Feet	186 Ft.
ROCK W/ STREAKS OF SHALE	186	300

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm SALTZGABER DRILLING CO.

Address 57 SOUTH FRANKLIN AVE. MANSFIELD, OHIO

Date April 18 1970

Signed Ray Saltzgaber

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

No 304701

County RICHLAND Township MADISON Section of Township 4

Owner CHARLES E. NAIL Address 559 CHEVY CHASE RD. - MANSF C

Location of property AT THE NORTH END OF AIRPORT RD. ON THE WEST S'D.

CONSTRUCTION DETAILS

Casing diameter 4 1/4 Length of casing ?

Type of screen —— Length of screen ——

Type of pump WORKING HEAD.

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST

Pumping Rate 9 G.P.M. Duration of test 1 hrs.

Drawdown 27 ft. Date SEPT. 23, 1963

Static level-depth to water 100 ft.

Quality (clear, ~~cloudy, taste, odor~~)

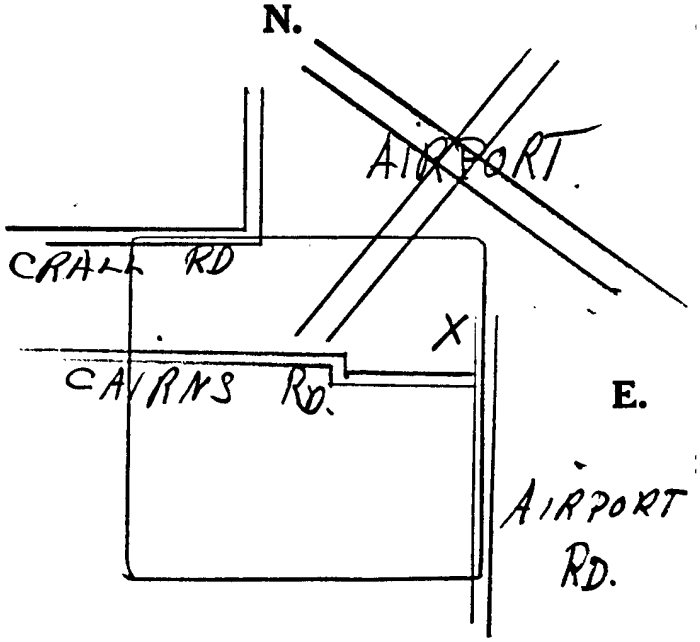
Pump installed by SALTZGABER DRILLING CO

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
OLD WELL WAS DRILLED DEEPER FROM 127'	0 Feet	.....Ft.
BLUE SHALE	127	145
GRAY SAND ROCK	145	165

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm SALTZGABER DRILLING CO

Address 57 SOUTH FRANKLIN AVE. MANSFIELD, OHIO

Date OCT. 5, 1963

Signed P M Saltzgaber

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

428940

County RICHLAND Township MADISON Section of Township 4

Owner RICHLAND COUNTY COMMISSIONERS Address 50 PARK AVE EAST - MANSFIELD O.

Location of property APPROX 1/2 MILE WEST OF MEMORIAL RD ON NORTH SIDE OF CAIRNS

CONSTRUCTION DETAILS

Casing diameter 4" Length of casing 52'-4"

Type of screen — Length of screen —

Type of pump Jet

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 9 G.P.M. Duration of test 1 hrs

Drawdown 42 ft. Date 5-31-72

Static level-depth to water 50 ft.

Quality (clear, ~~cloudy, taste, odor~~)

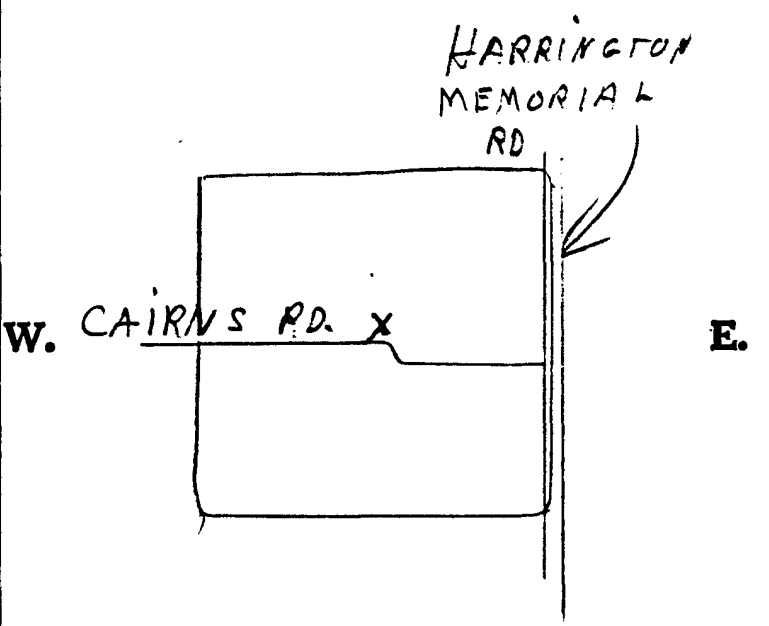
Pump installed by SALTZGABER DRILLING CO.

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
TOP SOIL	0 Feet	1 Ft.
CLAY - GRAVEL	1	44
SAND ROCK	44	120

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm SALTZGABER DRILLING CO.

Address 57 SOUTH FRANKLIN AVE. MANSFIELD, OHIO

Date June 10 1972

Signed RON SALTZGABER

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

No. 877 85025

County Richland Township Madison Section of Township or Lot Number 4

Owner Roy McBride Address Mansfield O

Location of property

CONSTRUCTION DETAILS

Casing diameter 4½ Length of casing 191

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

PUMPING TEST

Bail test

Pumping rate 15 G.P.M. Duration of test hrs.

Drawdown 50 ft. Date

Developed capacity

Static level—depth to water 40 ft.

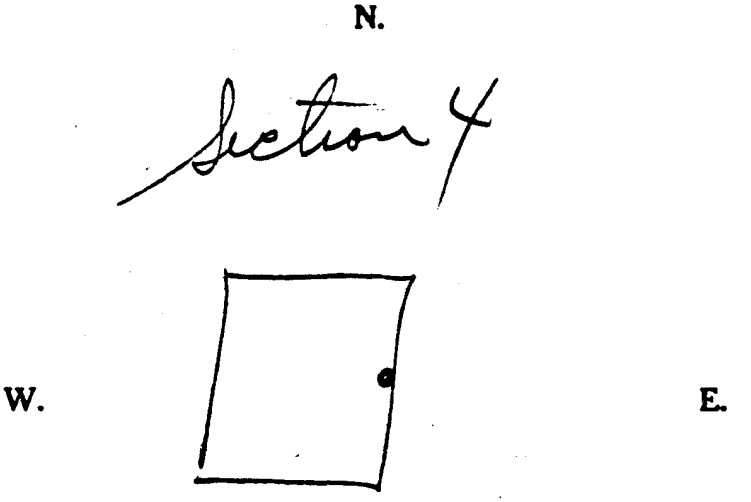
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay	0 Feet	110 Ft.
Sand	110	121
Clay	121	191
Sandstone	191	348

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm P. R. Huckington Date Aug 28-50

Address Bucyrus O Signed P. R. Huckington

WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

No. 881 76757

County RICHLAND Township MADISON Section of Township or Lot Number SEC. # 4

Owner EUGENE BOYLE Address RFD # 1 MANSFIELD

Location of property T.R. 203

CONSTRUCTION DETAILS

Casing diameter 4" Length of casing 25'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

PUMPING TEST

Pumping rate G.P.M. Duration of test hrs.

Drawdown 15 ft. Date

Developed capacity

Static level—depth to water 50' ft.

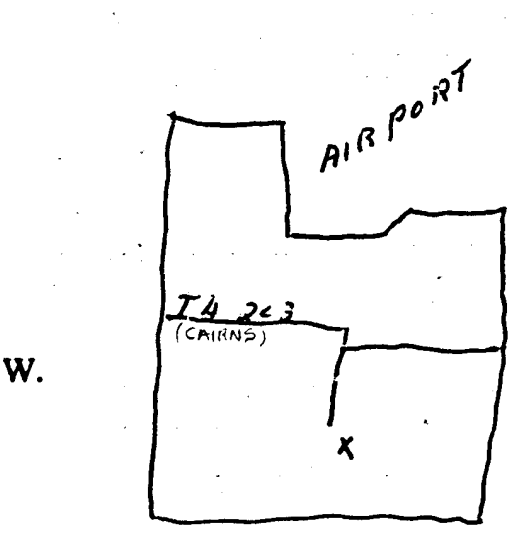
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
YELLOW CLAY	0 Feet	20 Ft.
GRAVEL	20	25
SHALE	25	50
SAND ROCK	50	85

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm EICH & DRLG CO. Date 1-10-52

Address C.O. COLROLE HTS MANSFIELD Signed Tony Eichol

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 422813

County Richland Township Madison Section of Township A

Owner Armstrong Auto Yard Address Cairns Rd

Location of property Cairns Rd ½ mile East of Bowman St.

CONSTRUCTION DETAILS

Casing diameter 4" Length of casing 79

Type of screen Length of screen

Type of pump ½ HP Red Jacket Sub

Capacity of pump 10 G.P.M.

Depth of pump setting 68 ft.

Date of completion 9/2/71

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 14 G.P.M. Duration of test 1 hrs.

Drawdown 0 ft. Date 9/2/71

Static level-depth to water 55 ft.

Quality (clear, cloudy, taste, odor) clear

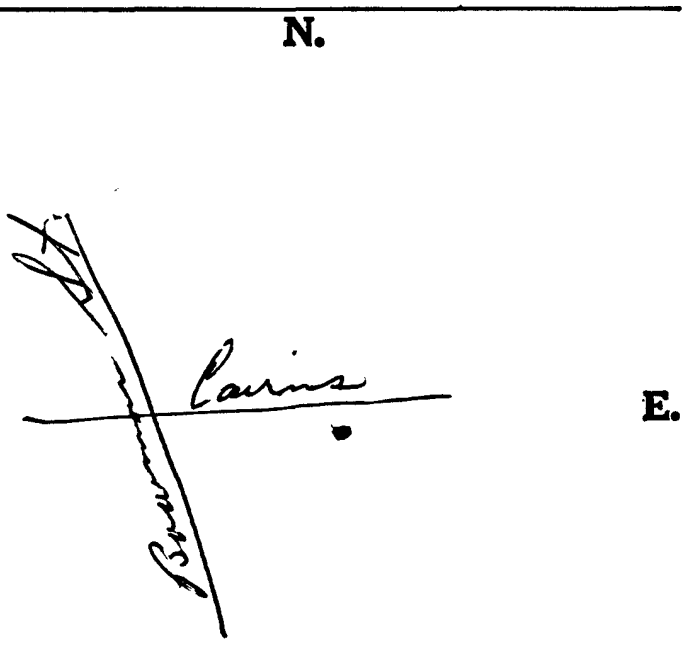
Pump installed by Wm J Jamison

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
clay	0 Feet	12 Ft.
blue mud & gravel	12	70
soft sandstone	70	79
sandstone	79	98
shale	98	101

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm Jamison Hutchinson Co Date 9/2/71

Address 239 Bowman Rd Mansfield Ohio Signed Wm J Jamison

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

No. 270168

County Richland Township Madison Section of Township 4

Owner Air National Guard 164th Fighter Sq. Address Municipal Airport - Mansfield O.

Location of property Same as address

CONSTRUCTION DETAILS

Casing diameter 8" Length of casing

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST

Pumping rate 80 G.P.M. Duration of test 2 hrs.

Drawdown 10 ft. Date 10-6-61

Developed capacity

Static level—depth to water 118' ft.

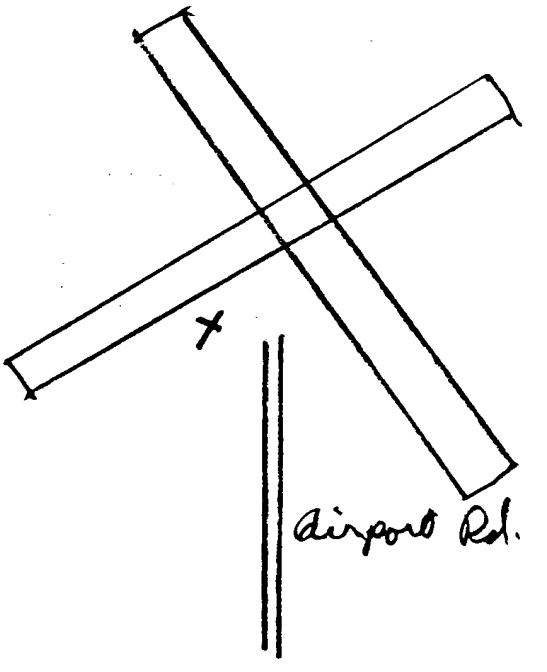
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
old Well Pulled	0 Feet	Ft.
Deeper.		
Hard Rock with Shale Streak	230	250

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm SALTZGABER DRILLING CO.

Address 57 SOUTH FRANKLIN AVE. MANSFIELD, OHIO

Date Oct 14 1961

Signed R M Saltzgaber

WELL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

No 298828

County RICHLAND Township MADISON Section of Township 5

Owner WAYNE CLEVELAND Address 80 WEST SECOND ST. MANSFIELD

Location of property NORTH OF CAIRNS + WEST OF BOWMAN ST. RD.

CONSTRUCTION DETAILS

Casing diameter 4 1/2 Length of casing 31'-5"

Type of screen NONE Length of screen —

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST

Pumping Rate 9 G.P.M. Duration of test 1 hrs.

Drawdown 3 ft. Date Aug. 14 1963

Static level-depth to water 55 ft.

Quality (clear, ~~cloudy, taste, odor~~)

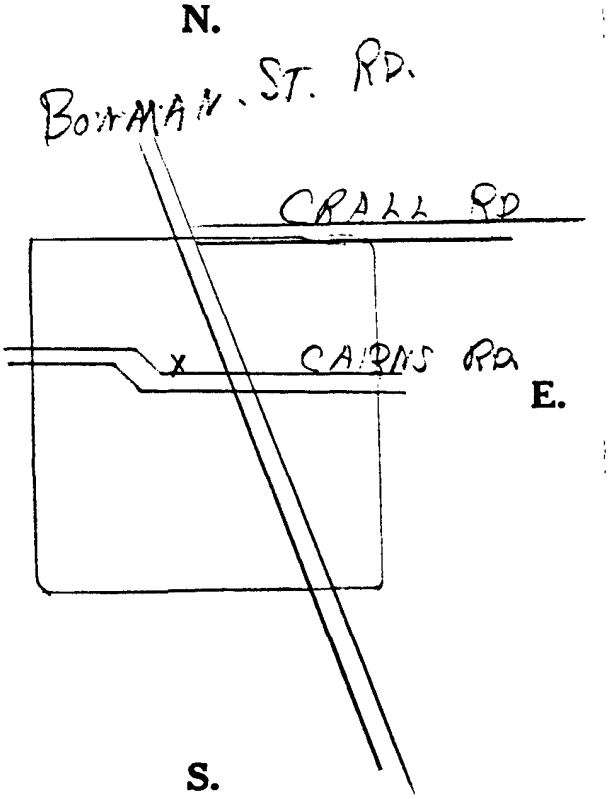
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
	0 Feet	12 Ft.
CLAY, SAND, & GRAVEL		
SOFT SAND ROCK	12	23
HARD SAND ROCK	23	85

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm SALTZGABER DRILLING CO.

Address 57 SOUTH FRANKLIN AVE. MANSFIELD, OHIO

Date Aug 24 1963

Signed OR Phil Saltzgaber

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

504563

COUNTY Richland TOWNSHIP Madison SECTION OF TOWNSHIP 5

OWNER Norman Porter ADDRESS Mansfield, O.

LOCATION OF PROPERTY Bowman St Ext.

CONSTRUCTION DETAILS

Casing diameter 5 Length of casing 50 ft.

Type of screen _____ Length of screen _____

Type of pump P.

Capacity of pump _____

Depth of pump setting _____

Date of completion 6-21-77

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 10 gpm Duration of test 2 hrs

Drawdown 12 ft Date 6-21-77

Static level (depth to water) 55 ft. ft

Quality (clear, cloudy, taste, odor) Clear

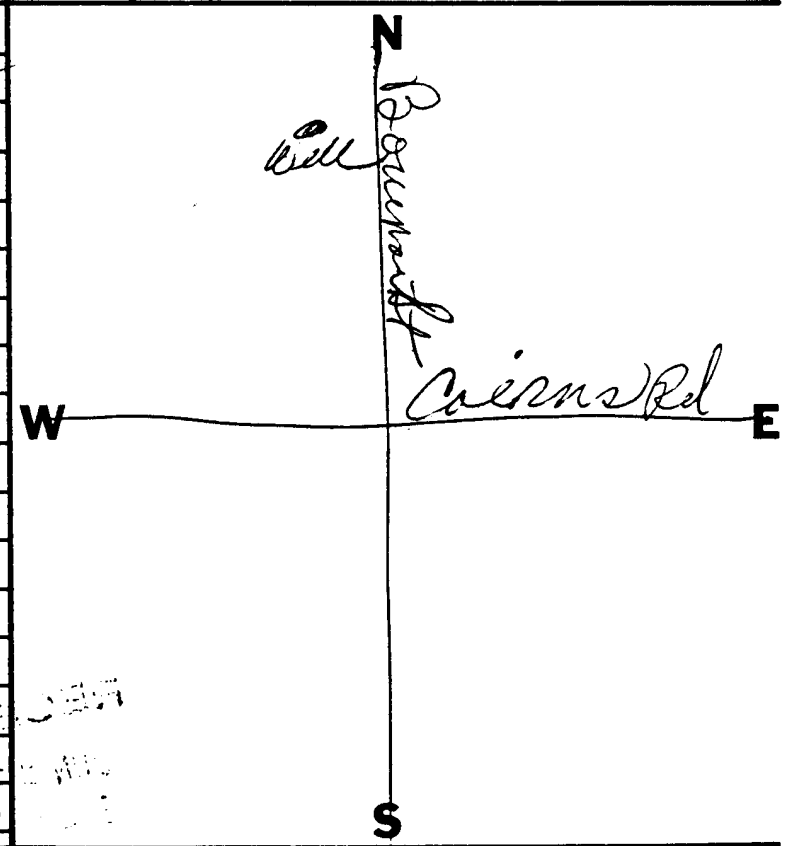
Pump installed by P.

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
Top Soil	0 ft	2 ft
Clay & Gravel	2ft	50 ft
Sand Stone	50 ft	80 ft.

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM H. E. Keen

ADDRESS R3 Fredericktown, O

DATE 6-23-77

SIGNED H E Keen

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

516861

COUNTY Richland TOWNSHIP Madison SECTION OF TOWNSHIP 5

OWNER Smith Brothers Builders ADDRESS 433 Eleanor Ave

LOCATION OF PROPERTY 3/4 mile West of Bowman Store Cairns Rd

CONSTRUCTION DETAILS

Casing diameter 4½ Length of casing 111

Type of screen ____ Length of screen ____

Type of pump ½ HP Red Jacket Sub

Capacity of pump 10 GPM

Depth of pump setting 105

Date of completion 6/28/77

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 14 gpm Duration of test 1 hrs

Drawdown 5 ft Date 6/27/77

Static level (depth to water) 60 ft

Quality (clear, cloudy, taste, odor) clear

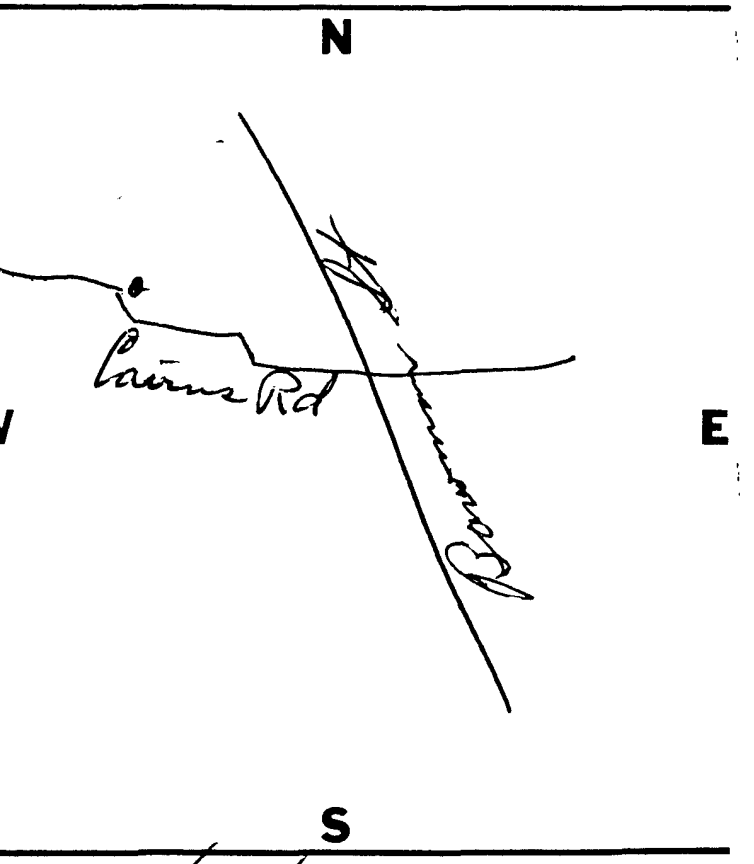
Pump installed by Wm. J. Johnson

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
Clay	0 ft	12 ft
Med. sand & gravel	12	85
Soft shale	85	111
shale	111	130

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM William J. Johnson Co. DATE 6/30/77

ADDRESS 1293 South Main St Mansfield Ohio SIGNED William J. Johnson

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

513303

COUNTY RICHLAND TOWNSHIP MADISON SECTION OF TOWNSHIP 5

OWNER ARTHUR EYERLY ADDRESS RT. #1, MANSFIELD, OHIO 1750 BOWMAN ST. RD. OLD BOWMAN ROADS

LOCATION OF PROPERTY APPROXIMATELY .1 MILE E. OF INTERSECTION OF BOWMAN AND

CONSTRUCTION DETAILS

Casing diameter 4 1/4" Length of casing 42' 8"

Type of screen — Length of screen —

Type of pump DEEP WELL SUB

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 12 gpm Duration of test 1 1/2 hrs

Drawdown 0 ft Date 11-19-76

Static level (depth to water) 36' ft

Quality (clear, ~~cloudy, taste, odor~~)

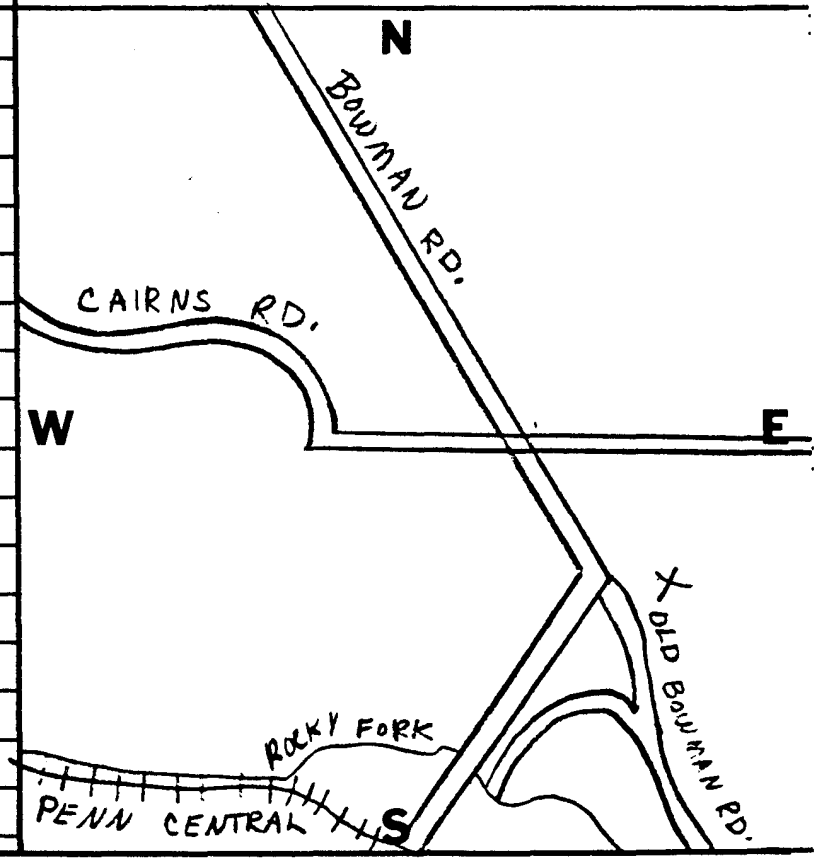
Pump installed by SALTZGABER DRILLING

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
TOP SOIL	0 ft	1 ft
CLAY, SAND & GRAVEL	1	5
SAND ROCK	5	30
SAND ROCK	30	100

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM SALTZGABER DRILLING CO.

ADDRESS 57 S. Franklin Ave. ~~Mansfield, Ohio 44902~~

DATE November 27, 1976

SIGNED RM Saltzgaber (RD 5)

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

492269

COUNTY RICHLAND TOWNSHIP MADISON SECTION OF TOWNSHIP OR LOT NUMBER 5

OWNER LARRY WOOD ADDRESS RD 3 CAIRNS RD MANSFIELD, OH

LOCATION OF PROPERTY 3 MI W OF BOWMAN RD ON N. SIDE OF CAIRNS RD.

CONSTRUCTION DETAILS

Casing diameter 4 "ID Length of casing 42'-8"

Type of screen — Length of screen —

Type of pump DEEP WELL SUB

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 15 gpm Duration of test 1½ hrs

Drawdown 0 ft Date 10-24-75

Static level (depth to water) 45 ft

Quality (clear, ~~cloudy, taste, odor~~)

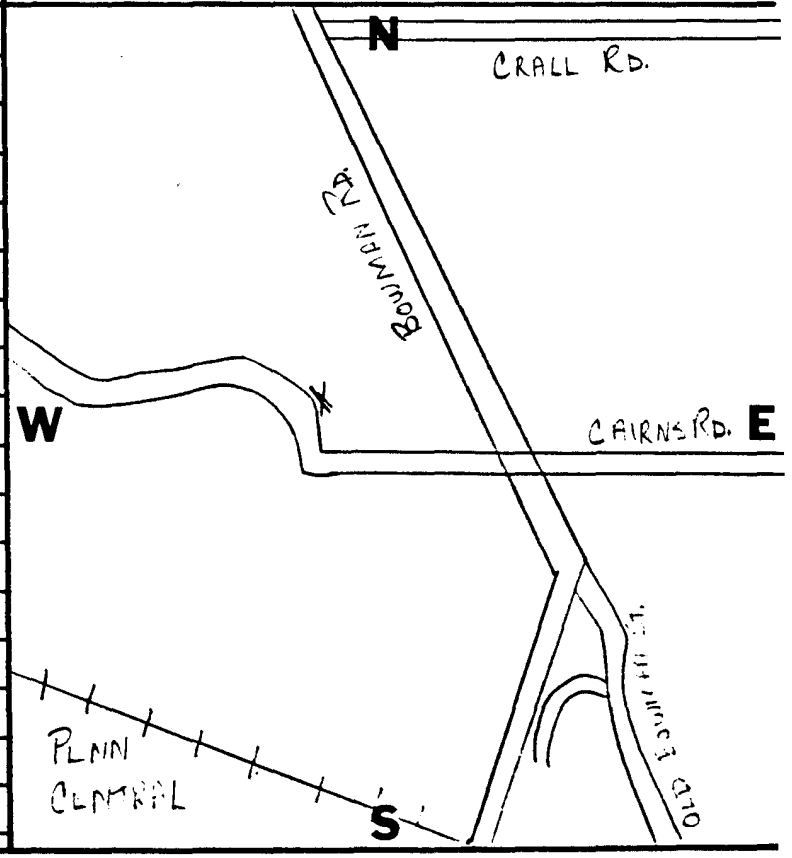
Pump installed by SALTZGABER DRILLING CO.

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
CLAY, SAND, GRAVEL	0 ft	34 ft
SAND ROCK	34	100

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



SALTZGABER DRILLING CO.
DRILLING FIRM 57 SOUTH FRANKLIN AVE.
ADDRESS MANSFIELD, OHIO

DATE NOVEMBER 1 1975

SIGNED [signature]

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 406704

County Richland Township Madison Section of Township 5

Owner Developers Inc Address 1234 Evergreen Ave Mansfield

Location of property ½ mile East of Bowman St on Cairns Rd

CONSTRUCTION DETAILS

Casing diameter 4½ Length of casing 58

Type of screen Length of screen

Type of pump ½ HP Red Jacket Sub

Capacity of pump 8 GPM

Depth of pump setting 84

Date of completion 7/18/70

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 14 G.P.M. Duration of test 1 hrs.

Drawdown 10 ft. Date 7/18/70

Static level-depth to water 50 ft.

Quality (clear, cloudy, taste, odor) clear

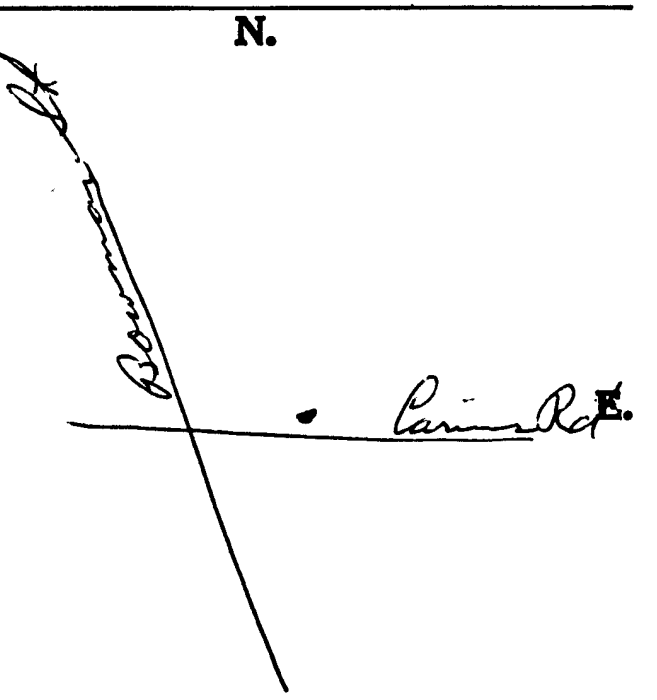
Pump installed by Wm J Jamison

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
clay	0 Feet	4 Ft.
blue mud & gravel	4	52
soft sandstone	52	58
sandstone	58	87
shale	87	103

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm Jamison Drilling Co Date 7/27/70

Address 239 Rowland Rd Mansfield Ohio Signed Wm J Jamison

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

No. 264098

County Richland Township Madison Section of Township Sec. 5

Owner Walter Wilcox Address Bowman St. Rd - Mansfield, O

Location of property 1 mi North of Mansfield on Bowman St Rd - 1/4 mi West on Carrier Rd

CONSTRUCTION DETAILS

Casing diameter 4 1/4" Length of casing 33 Ft.

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST

Pumping rate 12 G.P.M. Duration of test 1 hrs.

Drawdown 2 ft. Date 1-25-62

Developed capacity

Static level—depth to water 36 ft.

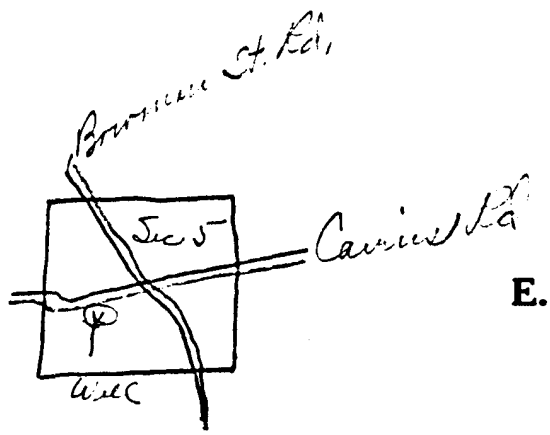
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay	0 Feet	33 Ft.
Rock	33 ft.	69 ft.

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Shelby Well Drilling

Address 1000 Claremont Ave. Ashland, Ohio

Date 1-26-62

Signed Frank R. Shirley

WELL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

No. 264097

County Richland Township Madison Section of Township Lot 5

Owner Walter Wilgus Address Bowman St. Rd. Mansfield, O

Location of property 1 mi. North of Mansfield on Bowman St. Rd. West on Cairns Rd.

CONSTRUCTION DETAILS

Casing diameter 4 1/4" Length of casing 41'7"

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST

Pumping rate 12 G.P.M. Duration of test 1 hrs.

Drawdown 3 ft. Date 1-24-62

Developed capacity

Static level—depth to water 35 ft.

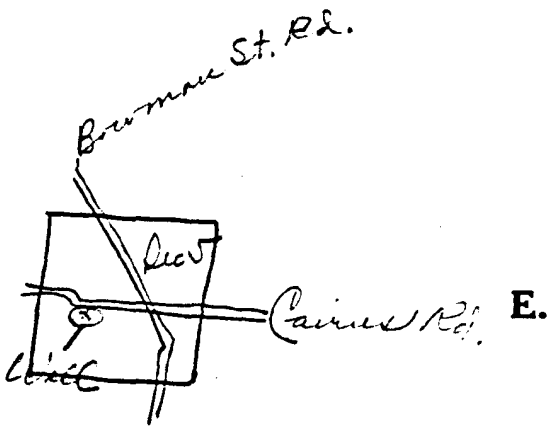
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay	0 Feet	41 Ft.
Rock	41 ft.	70 ft.

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Shaw Well Drilling

Address 1006 Claremont Ave. Ashland, Ohio

Date 1-26-62

Signed Frank E. Shaw

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

No 291563

County Richland Township Madison Section of Township 5

Owner Kenneth Rose Address Rt 1 Mansfield O,

Location of property Crall Rd at Corner of Hecht Rd,

CONSTRUCTION DETAILS

Casing diameter 4" Length of casing 76'

Type of screen ..... Length of screen .....

Type of pump Deep Well

Capacity of pump 300 GPH

Depth of pump setting 70'

Date of completion 5-29-63

BAILING OR PUMPING TEST

Pumping Rate 10 G.P.M. Duration of test 1 hrs.

Drawdown 10' ft. Date 5-29-63

Static level-depth to water 55' ft.

Quality (clear, cloudy, taste, odor) Cloudy

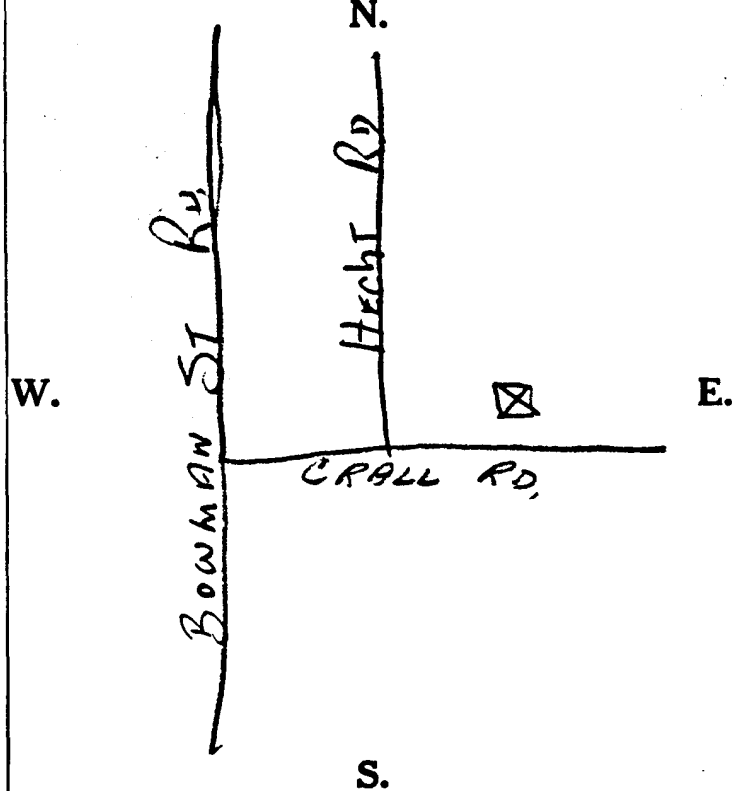
Pump installed by .....

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
	0 Feet	.....Ft.
Top Soil	0	2
Yellow Clay	2	19
Blue Clay Sand & Gravel	19	76
Blue Rock.	76	85.

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm W & W Burkhart Date 5-29-63

Address Rt 2 Shiloh O Signed W & W Burkhart

WELL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

No. 356403

County Richland Township Madison Section of Township 5

Owner Neil Robinson Address Laurna Rd

Location of property ½ mile West of Bowman Store Laurna Rd

CONSTRUCTION DETAILS

Casing diameter 4½ Length of casing 169

Type of screen Length of screen

Type of pump ½ HP Red Jacket

Capacity of pump 8 G.P.M.

Depth of pump setting 147

Date of completion 10/3/66

BAILING OR PUMPING TEST

Pumping Rate 8 G.P.M. Duration of test 1 hrs.

Drawdown 90 ft. Date 10/3/66

Static level-depth to water 40 ft.

Quality (clear, cloudy, taste, odor) clear

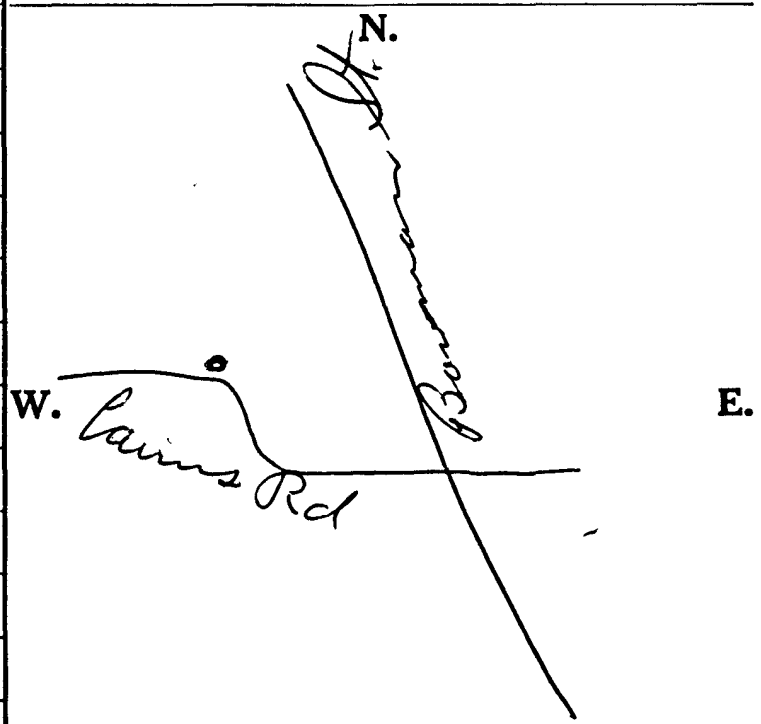
Pump installed by Wm J. Jamison

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
clay	0 Feet	8 Ft.
blue gray gravel	8	169
shale	169	181

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

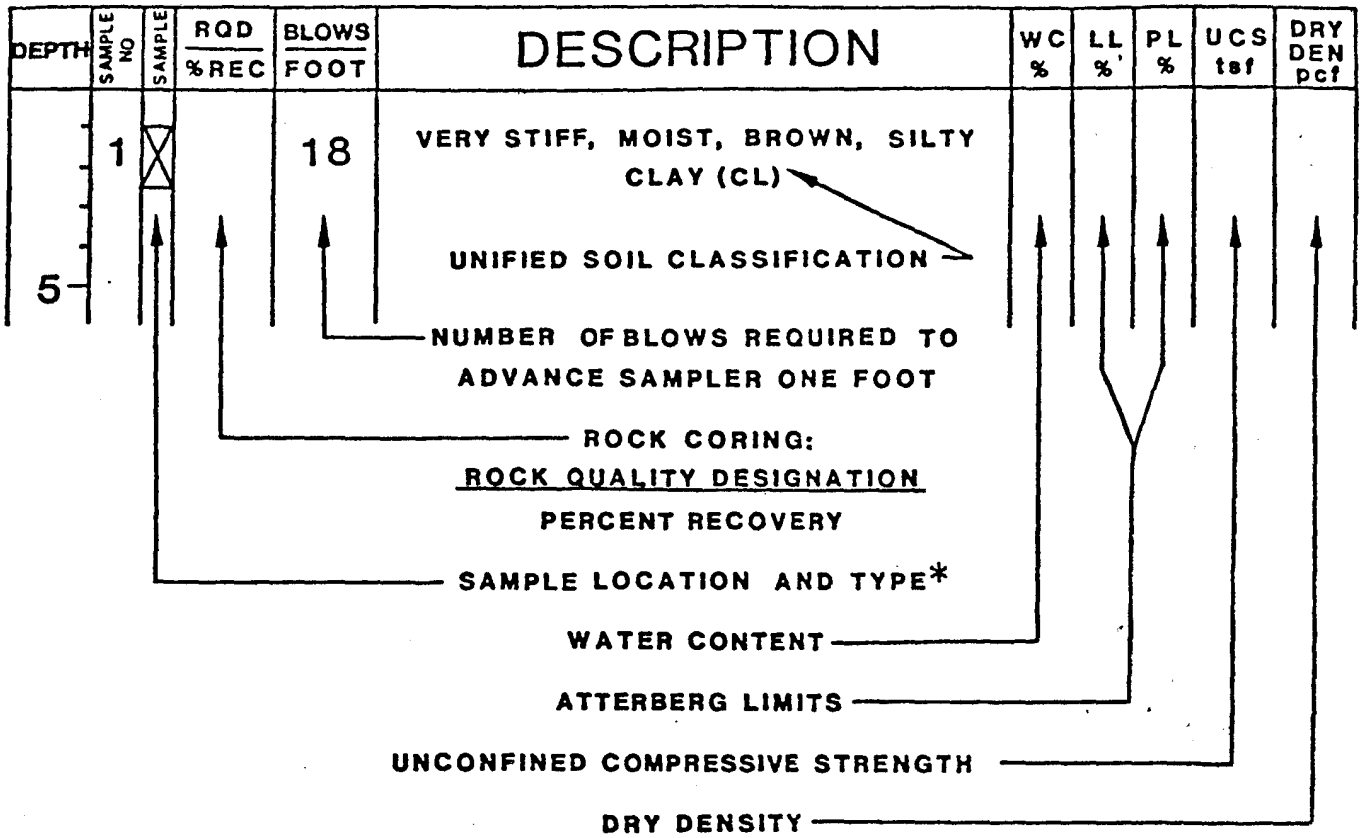
Drilling Firm Jamison Drilling Co. Date 10/17/66

Address 645 Orchard Dr. E Signed William J. Jamison
Mansfield Ohio

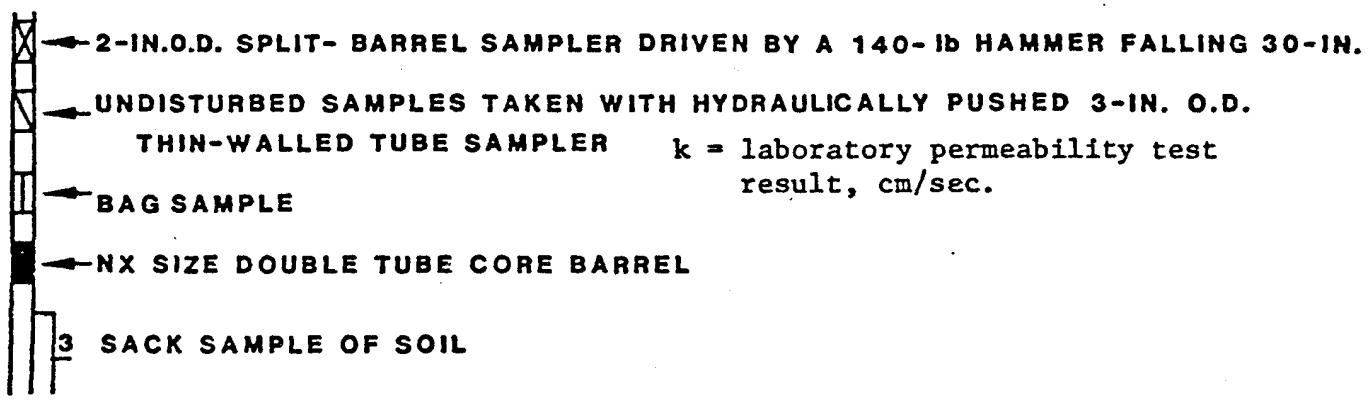
*If additional space is needed to complete well log, use next consecutive numbered form.

APPENDIX C

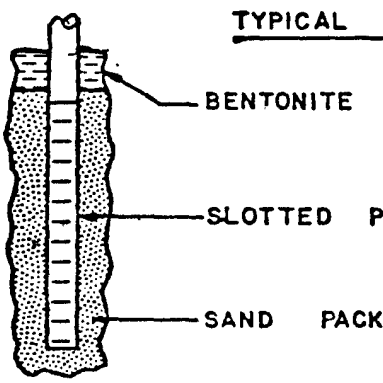
Well logs of borings around the perimeter of the landfill. These logs are used in understanding the subsurface make-up of the landfill.



*SAMPLE IDENTIFICATION



TYPICAL OBSERVATION WELL CONSTRUCTION



KEY TO LOG OF BORINGS

RICHLAND COUNTY LANDFILL – MANSFIELD, OHIO – EMPIRE DETROIT STEEL

DRAWN BY: RGB	CHECKED BY: KCM	PROJECT NO: 81C8027	DATE: 15 SEPT. '81	FIGURE NO: 3

WOODWARD-CLYDE CONSULTANTS

LOCATION See Figure 2 | DATE DRILLED 2 September 1981

KEY TO BORING LOGS See Figure 3 | WATER LEVEL

SURFACE ELEVATION 1224.8' | DATE MEASURED

DEPTH	SAMPLE NO	SAMPLE	WELL LOG	BLOWS FOOT	DESCRIPTION	WC %	LL %	PL %	UCS tsf	DRY DEN pcf
					Very stiff, moist, brown, sandy CLAY (CL) with trace silt, fine to coarse sand and sandstone fragments.					
5	1			15						
					Very stiff, moist, gray, silty CLAY (CL) with trace medium sand, rock fragments and fine sand seams.					
10	2			18						
	3			11						
15										
	4				.....water in fine sand seams $k = 2 \times 10^{-8}$ cm/second	15	23	15		120
20										
	5			20	.....becomes saturated					
25										
					Dense, saturated, gray, silty SAND and GRAVEL (SM-GM).					
30	6			32						
	7			26	Stiff, saturated, gray, silty CLAY (CL) with trace fine to coarse sand and gravel.					
35										
	8			15	Medium dense, saturated, brown-gray, clayey fine SAND (SC).					
40										

LOG OF BORING 1

RICHLAND COUNTY LANDFILL, MANSFIELD, OHIO – EMPIRE DETROIT STEEL

DRAWN BY: RGB	CHECKED BY: KCM	PROJECT NO: 81C8027	DATE: 15 SEPT. '81	FIGURE NO: 4

WOODWARD-CLYDE CONSULTANTS

LOCATION See Figure 3 DATE

KEY TO BORING LOGS See Figure 3 WATER LEVEL

SURFACE ELEVATION 1224.8' DATE MEASURED

DEPTH	SAMPLE NO	SAMPLE	WELL LOG	BLOWS FOOT	DESCRIPTION	WC %	LL %	PL %	UCS tsf	DRY DEN pcf
					Medium dense, clayey fine SAND (SC) continued					
	9	☒		50/6" 50/2"	Very dense, saturated, brown-tan, fine to medium SAND (SP)-- decomposed SANDSTONE					
45					Boring Terminated at 44.2'					

Water Level History

11 Sept. 1981	24.9'
16 Sept. 1981	23.3'
17 Sept. 1981	22.8'
25 Sept. 1981	22.2'

LOG OF BORING 1 (CONTINUED)

RICHLAND COUNTY LANDFILL — MANSFIELD, OHIO — EMPIRE DETROIT STEEL

DRAWN BY: RGB	CHECKED BY: KCM	PROJECT NO: 81C8027	DATE: 15 SEPT. '81	FIGURE NO: 4 (Con't)

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOCATION See Figure | DATE ILLED 3 September 1981

KEY TO BORING LOGS See Figure 3 | WATER LEVEL

SURFACE ELEVATION 1247.8' | DATE MEASURED

DEPTH	SAMPLE NO	SAMPLE	WELL LOG	BLOWS FOOT	DESCRIPTION	WC %	LL %	PL %	UCS tsf	DRY DEN pcf
					Very stiff to hard, damp, brown, silty CLAY (CL) with trace sand, gravel and sandstone fragments.					
5	1			17						
10	2			22		17	25	11		
15	3			42/6" 50/5"	.....sandstone fragments in top of spoon					
20	4			45	Very stiff to hard, wet, gray, silty CLAY (CL) with little sand and gravel and irregular sand lenses					
25	5			51	.....changing to gray-brown					
30	6			13						
	7			50/1" 50/1"	Very dense, saturated, brown-tan, fine SAND (SP) -- decomposed SANDSTONE					
35					Water Level History 11 Sept. 1981 12.8' 16 Sept. 1981 11.0' 17 Sept. 1981 10.8' 25 Sept. 1981 11.9'					

LOG OF BORING 2

RICHLAND COUNTY LANDFILL - MANSFIELD, OHIO - EMPIRE DETROIT STEEL

DRAWN BY: RGB | CHECKED BY: KCM | PROJECT NO: 81C8027 | DATE: 15 SEPT. '81 | FIGURE NO: 5

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOCATION See Figure 4 DATE DRILLED 4 September 1981

KEY TO BORING LOGS See Figure 3 WATER LEVEL

SURFACE ELEVATION 1231.7' DATE MEASURED

DEPTH	SAMPLE NO	SAMPLE	WELL LOG	BLOWS FOOT	DESCRIPTION	WC %	LL %	PL %	UCS tsf	DRY DEN pcf
					Medium dense, moist, yellow-brown, sandy SILT (ML) with trace clay and rock fragments.					
5	1			14						
					Stiff to very stiff, moist, gray, silty CLAY (CL) with little fine sand and irregular seams of fine sand approximately 1/16" to 1/8" thick.					
10	2			13						
					$k = 3 \times 10^{-8}$ cm/second	20	24	18		109
15	3									
					Medium dense, saturated, gray, fine to coarse SAND (SM) with trace clay and gravel.					
20	4			24						
					Very stiff to hard, saturated, gray, silty CLAY (CL) with fine to medium sand and rock fragments.					
25	5			24		18	28	18		
					Medium dense to very dense, saturated, gray, silty fine to coarse SAND (SM) with some gravel and interbedded clayey silt lenses					
30	6			26						
35	7			55						
	8			50/2"						
40					Boring Terminated at 38.2'					

LOG OF BORING 3

RICHLAND COUNTY LANDFILL - MANSFIELD, OHIO - EMPIRE DETROIT STEEL

DRAWN BY: RGB	CHECKED BY: KCM	PROJECT NO: 81C8027	DATE: 15 SEPT. '81	FIGURE NO: 6

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOCATION See Figure 4 DATE DRILLED

KEY TO BORING LOGS See Figure 3 WATER LEVEL

SURFACE ELEVATION 1252.7' DATE MEASURED

DEPTH	SAMPLE NO	SAMPLE	WELL LOG	BLOWS FOOT	DESCRIPTION	WC %	LL %	PL %	UCS tsf	DRY DEN pcf
					Very stiff to hard, damp, brown, silty CLAY (CL) with trace fine to coarse sand, gravel and sandstone fragments.					
5	1	X		21						
10	2	X		39		17	32	20		
15	3	X		24						
					Very stiff, moist, gray, SILT and CLAY (ML-CL) with little fine to coarse sand and shale fragments.					
20	4	X		20						
25	5	X		17		14	24	18		
					Dense, saturated, gray, silty CLAY and SAND (CL-SC) with trace gravel.					
30	6	X		33						
					Very dense, saturated, gray, fine to coarse, silty-clayey SAND (SC) with little gravel.					
35	7	X		51						
40	8	X		51						

LOG OF BORING 4

RICHLAND COUNTY LANDFILL – MANSFIELD, OHIO – EMPIRE DETROIT STEEL

DRAWN BY: RGB	CHECKED BY: KCM	PROJECT NO: 81C8027	DATE: 15 SEPT. '81	FIGURE NO: 7

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

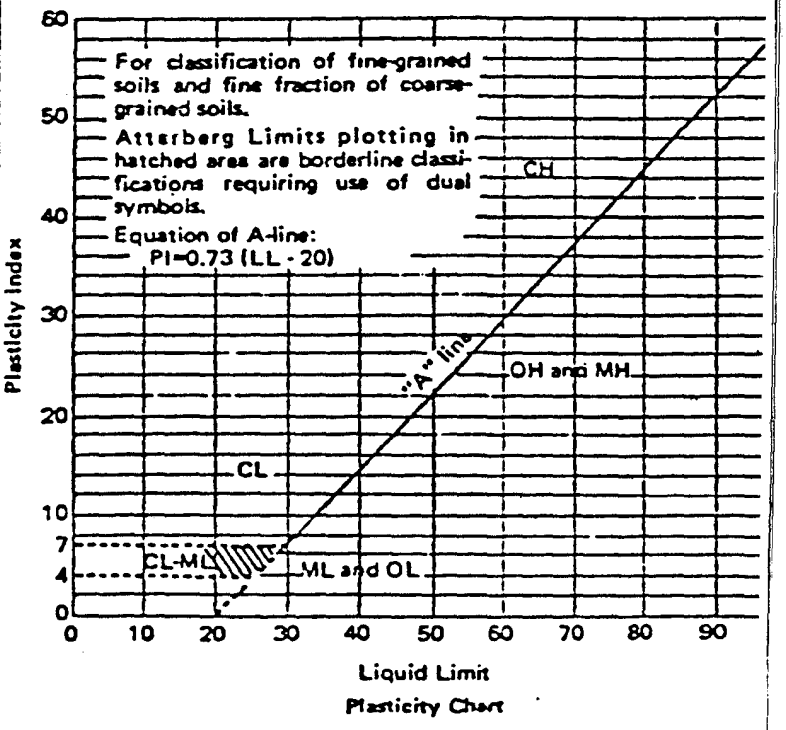
UNIFIED SOIL CLASSIFICATION SYSTEM

Major divisions			Group symbols	Typical names	Laboratory classification criteria
Coarse-grained soils (More than half of material is *larger* than No. 4 sieve size)	Gravels (More than half of coarse fraction larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW
		Gravels with fines (Appreciable amount of fines)	GM d / u	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and
			SP	Poorly graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW
		Sands with fines (Appreciable amount of fines)	SM d / u	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
Fine-grained soils (More than half of material is *smaller* than No. 200 sieve)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
			OL	Organic silts and organic silty clays of low plasticity	
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
Highly organic soils			Pt	Peat and other highly organic soils	

Determine percentages of sand and gravel from grain-size curve.
Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:
Less than 5 per cent ..... GW, GP, SW, SP
More than 12 per cent ..... GM, GC, SM, SC
5 to 12 per cent ..... *Borderline* cases requiring dual symbols

Above "A" line with between 4 and 7 are *derline* cases requiring of dual symbols

Limits plotting in hatc zone with P.I. betwee and 7 are *borderline* requiring use of dual s bols.

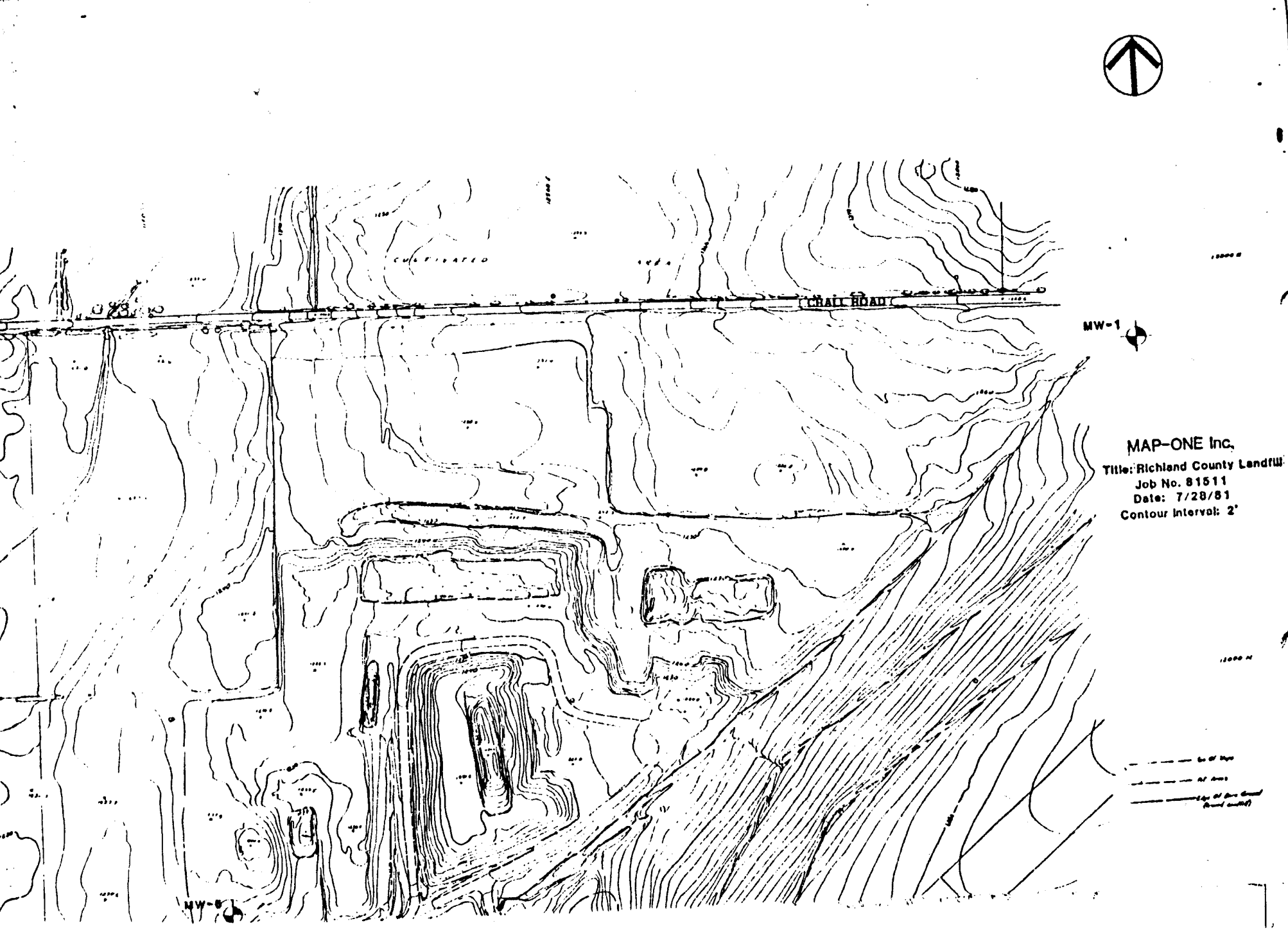


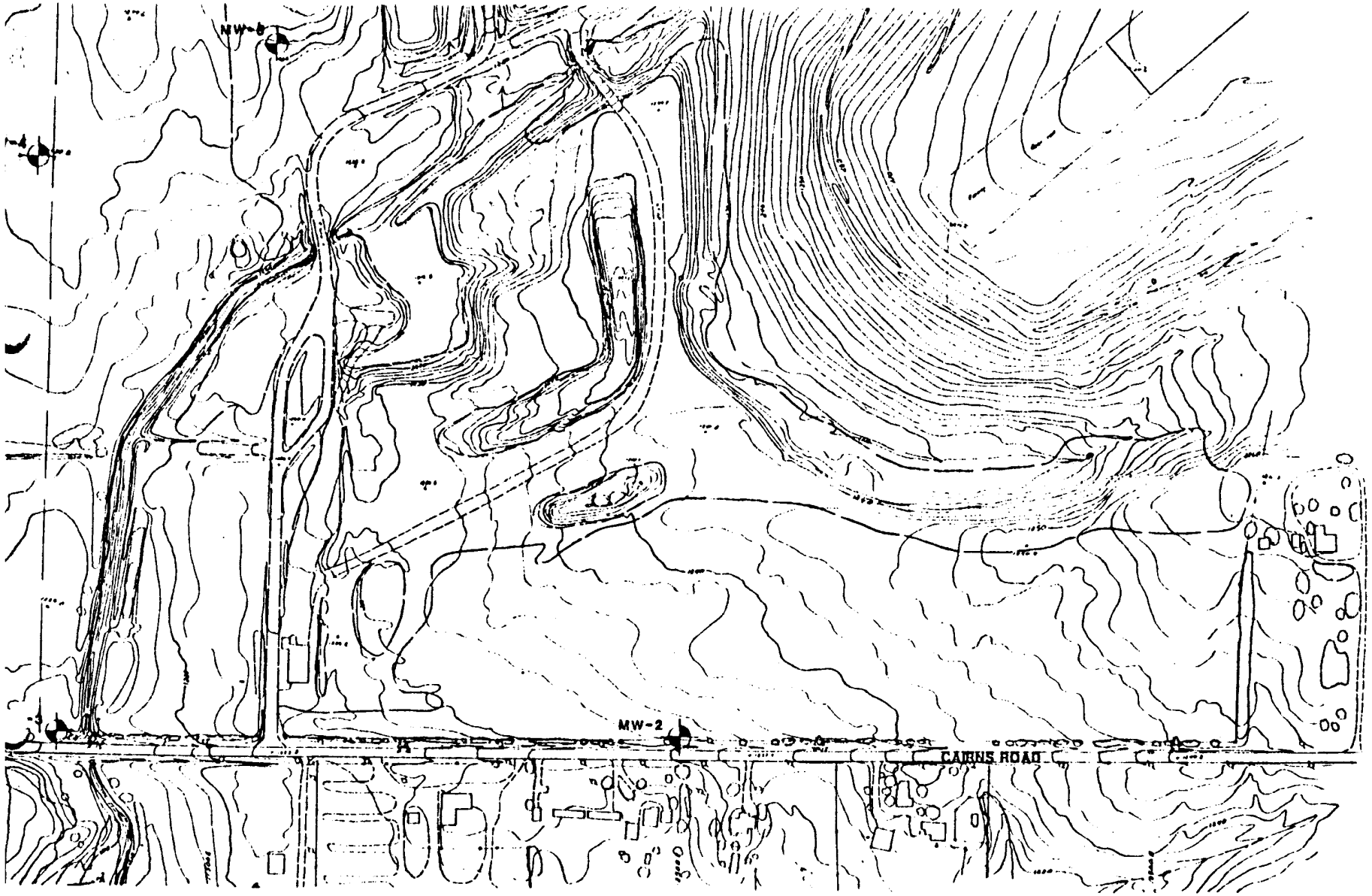
Plasticity Chart

WOODWARD-CLYDE CONSULTANTS

APPENDIX D

Well logs of the five monitoring wells, along with their location.


CHAIL ROAD
MW-1
MW-5
MAP-ONE Inc.
Title: Richland County Landfill
Job No. 81511
Date: 7/28/81
Contour Interval: 2'



Note: Elevation-USGS Datum

Monitoring Well Location

MONITORING WELL LOCATION DIAGRAM

RICHLAND COUNTY LANDFILL
RICHLAND COUNTY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY CES	SCALE	DATE 8 JAN 82

LOCATION See Figure 1 | DATE DRILLED 13 November 1981

KEY TO BORING LOGS See Figure 2 | WATER LEVEL 17.5' (From top of PVC)

SURFACE ELEVATION 1261.4' | DATE MEASURED 3 December 1981

DEPTH	SAMPLE NO	SAMPLE	WELL LOG	BLOWS/FOOT	DESCRIPTION	WC %	LL %	PL %	UCS tsf	DRY DEN pcf
5	1			20	Very stiff, moist, brown-gray (mottled) silty CLAY (CL) with sandstone fragments, rock fragments and fine sand					
10	2			21	Very stiff, moist, gray, silty CLAY (CL) with fine sand lenses					
15	3			17	.....Becomes saturated					
20	4			13						
25	5			22						
30	6			17						
35	7			23						
40	8			19	Monitoring well elevation Top of PVC 1263.0' Termination Depth 40.0'					

LOG OF BORING 14 (MW-1)

RICHLAND COUNTY LANDFILL - RICHLAND COUNTY

DRAWN BY: MWK | CHECKED BY: KCM | PROJECT NO: 81C8033A | DATE: 12/30/81 | FIGURE NO: 4

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOCATION See Figure 1 | DATE DRILLED 16 November 1981

KEY TO BORING LOGS See Figure 2 | WATER LEVEL 33.6' (From top of PVC)

SURFACE ELEVATION 1232.3' | DATE MEASURED 3 December 1981

DEPTH	SAMPLE NO	SAMPLE	WELL LOG	BLOWS / FOOT	DESCRIPTION	WC %	LL %	PL %	UCS tsf	DRY DEN pcf
					Stiff, moist, brown, silty CLAY (CL) with sandstone and shale fragments					
45	9	X		40	Stiff, saturated, gray, silty CLAY (CL) with fine sand, rock fragments					
					Termination depth 45.0'					
					Monitoring well elevation					
					Top of PVC 1233.4'					

LOG OF BORING 15 (MW-2) cont.

RICHLAND COUNTY LANDFILL - RICHLAND COUNTY

DRAWN BY: MWK	CHECKED BY: KCM	PROJECT NO: 81C8033A	DATE: 12/30/81	FIGURE NO: 5

LOCATION See Figure 1 | DATE DRILLED 13 November 1981

KEY TO BORING LOGS See Figure 2 | WATER LEVEL 31.4' (From top of PVC)

SURFACE ELEVATION 1215.4' | DATE MEASURED 3 December 1981

DEPTH	SAMPLE NO	SAMPLE	WELL LOG	BLOWS/FOOT	DESCRIPTION	WC %	LL %	PL %	UCS tsf	DRY DEN pcf
45					Wet, brown-tan, fine to medium SAND (SP) - SANDSTONE					
50										
55					Wet, brown-tan, SANDSTONE, few irregular clay seams, moderately hard Recovery - 3.8'/5.0' Rock Quality Designation - 22%					
					Termination Depth 58.0' Monitoring well elevation Top of PVC 1217.2'					

LOG OF BORING 16 (MW-3) cont.

RICHLAND COUNTY LANDFILL - RICHLAND COUNTY

DRAWN BY: MWK | CHECKED BY KCM | PROJECT NO: 81C8033A | DATE: 12/30/81 | FIGURE NO: 6

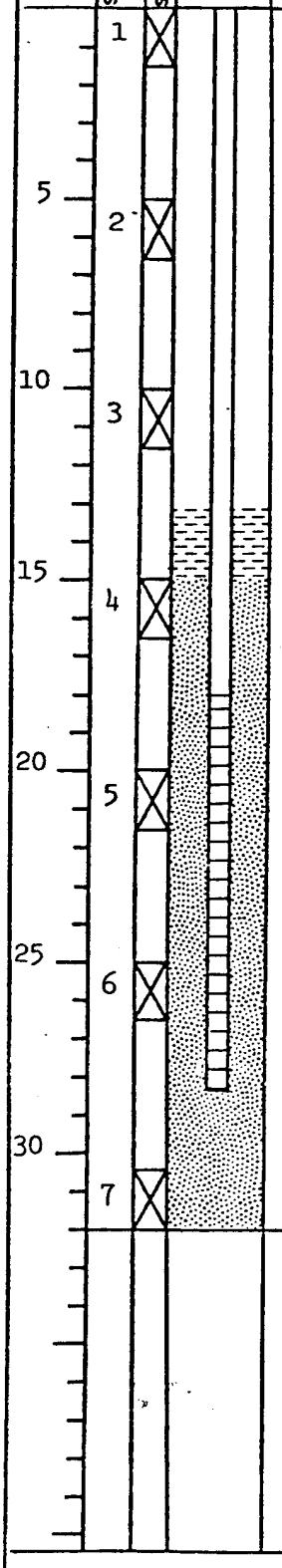
WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

LOCATION See Figure 1 | DATE DRILLED 11 November 1981

KEY TO BORING LOGS See Figure 2 | WATER LEVEL 21.6' (From top of PVC)

SURFACE ELEVATION 1232.6' | DATE MEASURED 2 December 1981



DEPTH	SAMPLE NO	SAMPLE	WELL LOG	BLOWS / FOOT	DESCRIPTION	WC %	LL %	PL %	UCS tsf	DRY DEN pcf
	1			16	Very stiff, moist, gray, silty CLAY (CL) with fine sand seams and rock fragments - FILL					
5	2			16						
					Paper, wood fragments - sanitary FILL - methane gas noted, strong smell					
10	3			18						
					Firm, wet, gray, silty CLAY (CL) with some sanitary fill material					
15	4			17						
20	5			20	Medium dense, saturated, silty SAND (SM) with gravel and clay					
25	6			25						
30	7			29						
					Termination depth 32.0'					
					Monitoring well elevation					
					Top of PVC 1234.3'					

LOG OF BORING 18 (MW-5)

RICHLAND COUNTY LANDFILL - RICHLAND COUNTY

DRAWN BY: MWK	CHECKED BY: KCM	PROJECT NO: 81C8033A	DATE: 12/30/81	FIGURE NO: 8

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

APPENDIX E

Monitoring well test results

9 FEBRUARY 1982

TABLE 1

MONITORING WELL SAMPLE TEST RESULTS

DRINKING WATER QUALITY PARAMETERS

RICHLAND COUNTY LANDFILL - FIRST QUARTER SAMPLING

PARAMETER	MW-1	MW-2	MW-3	MW-4	MW-5	MCL*
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	0.05
Barium	0.20	<0.20	<0.20	<0.20	0.44	1.0
Cadmium	<0.010	<0.010	<0.010	<0.010	<0.010	0.01
Chromium (Total)	<0.040	<0.040	<0.040	<0.040	<0.040	0.05†
Fluoride	1.1	<0.040	0.20	0.080	0.40	1.4-2.4
Lead	<0.040	<0.040	<0.040	<0.040	<0.040	0.05
Mercury	N.D.	N.D.	N.D.	N.D.	0.003	0.002
Nitrate-N	0.022	<0.010	3.0	0.097	<0.010	10
Selenium	0.002	0.001	0.001	<0.001	<0.001	0.01
Silver	<0.010	<0.010	<0.010	<0.010	<0.010	0.05
Endrin (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	0.2
Lindane (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	4
Methoxychlor (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	0.1
Toxaphene (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	5
2,4-D (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	0.1
2,4,5-TP (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	0.01
Radium (pCi/l)	<3	<3	<3	<3	<3	5
Gross Alpha (pCi/l)	<5	<5	<5	<5	<5	15
Gross Beta (pCi/l)	15	14	24	11	14	††
Coliform Bacteria	<1.2	<1.2	<1.2	<1.2	<1.2	1/100 ml

Results expressed in mg/l except as noted.

* - Maximum Contaminant Level

† - MCL for Cr^{+6}

†† - MCL = 4 millirems/year; refer to text

N.D. - Not Detectable

TABLE 2

MONITORING WELL SAMPLE TEST RESULTS

GROUNDWATER QUALITY PARAMETERS

RICHLAND COUNTY LANDFILL - FIRST QUARTER SAMPLING

PARAMETER	MW-1	MW-2	MW-3	MW-4	MW-5	SECONDARY MCL
Chloride	39	140	55	14	46	250
Iron	0.028	0.036	0.022	0.052	2.4	0.3
Manganese	0.011	0.013	0.028	0.24	0.48	0.05
Phenols	<0.020	<0.020	<0.020	<0.020	0.078	0.0001
Sodium	220	32	20	76	110	20
Sulfate	53	240	41	140	42	250

Note: -All results expressed in mg/l.

-Secondary Maximum Contaminant Levels are recommended concentration limits only and have been established in response to minimizing nuisance problems in drinking water such as staining, taste and odor.

-These parameters are used as a basis for comparison in the event a groundwater quality assessment is required under 40 CFR Part 265 - §265.93(d).

TABLE 3

MONITORING WELL SAMPLE TEST RESULTS

GROUNDWATER CONTAMINATION INDICATOR PARAMETERS

RICHLAND COUNTY LANDFILL - FIRST QUARTER SAMPLING

PARAMETER	MW-1(A)	MW-1(B)	MW-1(C)	MW-1(D)	MW-2	MW-3	MW-4	MW-5
pH	11.5	11.6	11.6	11.6	11.7	8.3	7.8	7.0
Specific Conductance	1480	1480	1480	1480	1460	520	640	1140
Total Organic Carbon	23	22	22	27	160	29	650	270
Total Organic Halogen								
--Bromine	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
--Chlorine	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
--Iodine	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

Note: Results expressed in mg/l except -

pH (standard units)
specific conductance (μmhos/cm)

Replicate measurements for MW-1 (upgradient well) to be used in determination of arithmetic mean and variance of parameter concentrations for first-year sampling.

20 APRIL 1982

TABLE 3

MONITORING WELL SAMPLE TEST RESULTS

DRINKING WATER QUALITY PARAMETERS

RICHLAND COUNTY LANDFILL - SECOND QUARTER SAMPLING

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MCL*
Arsenic	< 0.002	<0.002	< 0.002	< 0.002	0.002	0.05
Barium	< 0.10	<0.1	< 0.1	< 0.1	1.6	1.0
Cadmium	< 0.01	<0.01	< 0.01	< 0.01	< 0.01	0.01
Chromium (Total)	< 0.020	<0.020	< 0.020	< 0.020	< 0.020	0.05 †
Fluoride	0.60	0.68	< 0.1	0.19	0.54	1.4-2.4
Lead	<0.040	<0.040	< 0.040	< 0.040	< 0.040	0.05
Mercury	<0.001	<0.001	< 0.001	< 0.001	< 0.001	0.002
Nitrate-N	0.030	N.D.	5.1	0.01	1.1	10
Selenium	0.001	<0.001	< 0.001	< 0.001	< 0.001	0.01
Silver	<0.010	<0.010	< 0.010	< 0.010	< 0.010	0.05
Endrin (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	0.2
Lindane (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	4
Methoxychlor (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	100
Toxaphene (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	5
2,4-D (µg/l)	N.D.	N.D.	N.D.	N.D.	0.37	100
2,4,5-TP (µg/l)	N.D.	N.D.	N.D.	N.D	N.D.	10
Radium (pCi/l)	N.A.	N.A.	N.A.	N.A.	N.A.	5
Gross Alpha (pCi/l)	<3	N.D.	N.D.	N.D.	< 5	15
Gross Beta (pCi/l)	23	< 8	N.D.	< 8	< 5	15 ††
Coliform Bacteria	<1	< 1	< 1	< 1	19	1/100 ml

Results expressed in mg/l except as noted.

* - Maximum Contaminant Level

† - MCL for Cr^{+6}

†† - If average annual concentration exceeds 15 pCi/l, determine strontium-90 concentration

N.D. - Not Detectable

N.A. - Not Analyzed, refer to text

TABLE 4
MONITORING WELL SAMPLE TEST RESULTS
GROUNDWATER QUALITY PARAMETERS
RICHLAND COUNTY LANDFILL - SECOND QUARTER SAMPLING

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	Secondary MCL
Chloride	15	210	25	2	35	250
Iron	0.011	0.094	0.13	0.088	1.0	0.3
Manganese	<0.010	0.040	0.010	0.97	0.16	0.05
Phenols	N.D.	N.D.	N.D.	N.D.	0.020	0.0001
Sodium	72	33	12	24	34	20
Sulfate	96	210	42	84	35	250

Note: - All results expressed in mg/l.

- Secondary Maximum Contaminant Levels are recommended concentration limits only and have been established in response to minimizing nuisance problems in drinking water such as staining, taste and odor.

- These parameters are used as a basis for comparison in the event a groundwater quality assessment is required under 40 CFR Part 265 - § 265.93(d).

TABLE 5

MONITORING WELL SAMPLE TEST RESULTS

GROUNDWATER CONTAMINATION INDICATOR PARAMETERS

RICHLAND COUNTY LANDFILL - SECOND QUARTER SAMPLING

Parameter	MW-1(A)	MW-1(B)	MW-1(C)	MW-1(D)	MW-2	MW-3	MW-4	MW-5
pH	11.7	11.7	11.8	11.8	8.2	7.7	7.8	7.4
Specific Conductance	760	780	760	760	1300	610	580	1100
Total Organic Carbon	1100*	1300*	1000*	1000*	250	35	120	82
Total Organic Halogen								
--Bromine	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
--Chlorine	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
--Iodine	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

Note: Results expressed in mg/l except -

pH (standard units)

specific conductance (μmhos/cm)

Replicate measurements for MW-1 (upgradient well) to be used in determination of arithmetic mean and variance of parameter concentrations for first-year sampling.

*Results questionable; refer to text

28 JULY 1982

TABLE 3

MONITORING WELL SAMPLE TEST RESULTS

DRINKING WATER QUALITY PARAMETERS

RICHLAND COUNTY LANDFILL - THIRD QUARTER SAMPLING

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MCL*
Arsenic	< 0.010	< 0.010	<0.010	< 0.010	<0.010	0.05
Barium	< 0.10	< 0.10	<0.10	< 0.10	1.8	1.0
Cadmium	< 0.01	< 0.01	<0.01	< 0.01	< 0.01	0.01
Chromium (Total)	< 0.020	< 0.020	<0.020	< 0.020	< 0.020	0.05†
Fluoride	< 0.10	0.44	< 0.12	0.22	0.54	1.4-2.4
Lead	< 0.050	< 0.050	<0.050	< 0.050	< 0.050	0.05
Mercury	< 0.001	< 0.001	<0.001	< 0.001	< 0.001	0.002
Nitrate-N	0.030	< 0.010	6.4	< 0.010	< 0.010	10
Selenium	< 0.005	< 0.003	<0.005	< 0.003	< 0.005	0.01
Silver	< 0.020	< 0.020	<0.020	< 0.020	< 0.020	0.05
Endrin (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	0.2
Lindane (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	4
Methoxychlor (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	100
Toxaphene (µg/l)	N.D.	N.D.	N.D.	N.D.	N.D.	5
2,4-D (µg/l)	N.D.	N.D.	N.D.	N.D.	2.3	100
2,4,5-TP (µg/l)	N.D.	N.D.	0.22	N.D.	N.D.	10
Radium (pCi/l)	N.A.	N.A.	N.A.	N.A.	N.A.	5
Gross Alpha (pCi/l)	N.D.	N.D.	N.D.	N.D.	< 5	15
Gross Beta (pCi/l)	N.D.	< 8	N.D.	< 4	< 4	15††
Coliform Bacteria	< 1	< 1	<1	< 1	< 1	1/100 ml

Results expressed in mg/l except as noted.

* - Maximum Contaminant Level

† - MCL for $Cr+^{6}$

†† - If average annual concentration exceeds 15 pCi/l, determine strontium-90 concentration

N.D. - Not Detectable

N.A. - Not Analyzed, refer to text

TABLE 4
MONITORING WELL SAMPLE TEST RESULTS
GROUNDWATER QUALITY PARAMETERS
RICHLAND COUNTY LANDFILL - THIRD QUARTER SAMPLING

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	Secondary MCL
Chloride	20	280	44	6	3	250
Iron	0.026	0.016	0.012	0.018	98	0.3
Manganese	< 0.020	0.070	< 0.020	0.68	2.2	0.05
Phenols	N.D.	N.D.	N.D.	N.D.	0.68	0.0001
Sodium	30	30	17	5.6	220	20
Sulfate	92	230	46	80	<10	250

Note: - All results expressed in mg/l.

- Secondary Maximum Contaminant Levels are recommended concentration limits only and have been established in response to minimizing nuisance problems in drinking water such as staining, taste and odor.

- These parameters are used as a basis for comparison in the event a groundwater quality assessment is required under 40 CFR Part 265 - § 265.93(d).

TABLE 5

MONITORING WELL SAMPLE TEST RESULTS

GROUNDWATER CONTAMINATION INDICATOR PARAMETERS

RICHLAND COUNTY LANDFILL - THIRD QUARTER SAMPLING

Parameter	MW-1(A)	MW-1(B)	MW-1(C)	MW-1(D)	MW-2	MW-3	MW-4	MW-5
pH	9.3	9.4	9.6	9.6	7.7	7.2	7.3	6.8
Specific Conductance	400	400	390	420	1300	600	590	3300
Total Organic Carbon	66	66	77	120	69	27	47	1200
Total Organic Halogen								
--Bromine	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
--Chlorine	*	*	*	*	*	*	*	*
--Iodine	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

Note: Results expressed in mg/l except -

pH (standard units)

specific conductance (μmhos/cm)

Replicate measurements for MW-1 (upgradient well) to be used in determination of arithmetic mean and variance of parameter concentrations for first-year sampling.

*Error in test procedures; retesting required; see text.